

UTAH OIL AND GAS CONSERVATION COMMISSION

REMARKS: WELL LOG ELECTRIC LOGS FILE X WATER SANDS LOCATION INSPEC SUB. REPORT/abd.

DATE FILED MARCH 8, 1999

LAND: FEE & PATENTED

STATE LEASE NO.

PUBLIC LEASE NO.

UTU-65762

INDIAN

DRILLING APPROVED: APRIL 15, 1999

SPUDDED IN: 7-6-99

COMPLETED:

PUT TO PRODUCING:

INITIAL PRODUCTION:

GRAVITY A.P.I.

GOR:

PRODUCING ZONES:

TOTAL DEPTH:

WELL ELEVATION:

DATE ABANDONED:

FIELD: HELPER PROPOSED

UNIT:

COUNTY: CARBON

WELL NO. OLIVETO FEDERAL SWD A-3

43-007-30555

LOCATION 2714 FNL FT. FROM (N) (S) LINE,

1515 FEL

FT. FROM (E) (W) LINE SWNE

1/4 - 1/4 SEC. 8

TWP.

RGE.

SEC.

OPERATOR

TWP.

RGE.

SEC.

OPERATOR

GEOLOGIC TOPS:

| | | | |
|----------------|-----------------|------------------|-------------------|
| QUATERNARY | Star Point | Chinle | Molas |
| Alluvium | Wahweap | Shinarump | Manning Canyon |
| Lake beds | Masuk | Moenkopi | Mississippian |
| Pleistocene | Colorado | Sinbad | Humburg |
| Lake beds | Sego | PERMIAN | Brazer |
| TERTIARY | Buck Tongue | Kaibab | Pilot Shale |
| Pliocene | Castlegate | Coconino | Madison |
| Salt Lake | Mancos | Cutler | Leadville |
| Oligocene | Upper | Hoskinnini | Redwall |
| Norwood | Middle | DeChelly | DEVONIAN |
| Eocene | Lower | White Rim | Upper |
| Duchesne River | Emery | Organ Rock | Middle |
| Uinta | Blue Gate | Cedar Mesa | Lower |
| Bridger | Ferron | Halgaita Tongue | Ouray |
| Green River | Frontier | Phosphoria | Elbert |
| | Dakota | Park City | McCracken |
| | Burro Canyon | Rico (Goodridge) | Aneth |
| | Cedar Mountain | Supai | Simonson Dolomite |
| | Buckhorn | Wolfcamp | Sevy Dolomite |
| | JURASSIC | CARBONIFEROUS | North Point |
| Wasatch | Morrison | Pennsylvanian | SILURIAN |
| Stone Cabin | Salt Wash | Oquirrh | Laketown Dolomite |
| Colton | San Rafael Gr. | Weber | ORDOVICIAN |
| Flagstaff | Summerville | Morgan | Eureka Quartzite |
| North Horn | Bluff Sandstone | Hermosa | Pogonip Limestone |
| Almy | Curtis | | CAMBRIAN |
| Paleocene | Entrada | Pardox | Lynch |
| Current Creek | Moab Tongue | Ismay | Bowman |
| North Horn | Carmel | Desert Creek | Tapeats |
| CRETACEOUS | Glen Canyon Gr. | Akah | Ophir |
| Montana | Navajo | Barker Creek | Tintic |
| Mesaverde | Kayenta | | PRE - CAMBRIAN |
| Price River | Wing | Cane Creek | |
| Blackhawk | TRIA | | |

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on
reverse side)

Form approved.
Budget Bureau No. 1004-0136
Expires: December 31, 1991

APPLICATION FOR PERMIT TO DRILL OR DEEPEN

| | | | | | |
|--|-----------------------|-----------------|---|------------------------|--|
| 1 a. TYPE OF WORK DRILL <input checked="" type="checkbox"/> DEEPEN <input type="checkbox"/> | | | 5. LEASE DESIGNATION AND SERIAL NO. UTU-65762 | | |
| b. TYPE OF WELL OIL WELL <input type="checkbox"/> GAS WELL <input type="checkbox"/> <input checked="" type="checkbox"/> SWD OTHER - COALBED METHANE <input type="checkbox"/> SINGLE ZONE <input type="checkbox"/> MULTIPLE <input type="checkbox"/> | | | 6. IF INDIAN, ALLOTTEES OR TRIBE NAME | | |
| 2. NAME OF OPERATOR ANADARKO PETROLEUM CORPORATION | | | 7. UNIT AGREEMENT NAME | | |
| 3. ADDRESS AND TELEPHONE NO. 17001 Northchase Drive, Houston, Texas 77060 281/875-1101 | | | 8. FARM OR LEASE NAME WELL NO. Oliveto Federal SWD A-3 | | |
| 4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.) At surface 2714 FNL 2722 FSL 1515 FEL, SE Section 8, T14S R10E At proposed prod. zone 2714 FNL 2722 FSL 1515 FEL, SE Section 8, T14S R10E CONFIDENTIAL | | | 9. API WELL NO. | | |
| 14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE. 1 mile NW of Price, Ut | | | 12. COUNTY Carbon | | |
| 15. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any) 1515' | | | 16. NO. OF ACRES IN LEASE 1474' | | |
| 18. DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE. FT. | | | 19. PROPOSED DEPTH 7000' | | |
| 21. ELEVATIONS (Show whether DF, RT, GR, etc.) 5678' GL | | | 22. APPROX. DATE WORK WILL START. April 16 1999 | | |
| 23. PROPOSED CASING AND CEMENTING PROGRAM | | | | | |
| SIZE OF HOLE | GRADE, SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | QUANTITY OF CEMENT | |
| 17-1/2" | 13-5/8" H-40 | 48# | 300' | 420 cu. ft. | |
| 12-1/4" | 8 5/8" K-55 | 24# | 2800' | 1800 cu. ft. | |
| 7-7/8" | 5-1/2" K-55 | 15.5# | 6200' | TBD - BASED ON OH LOGS | |

Attached is the following:

1. Survey Plat
2. Drilling Plan with BOP Schematic, Figure 1-1
3. Surface Use Plan
4. Certification of Operator
5. Topo & Access Map & Area Map.
6. Pit & Pad Layout with cross sections of pit, pad, & rig layout.

The Cultural Resource Study was submitted under separate cover.

Nationwide BLM Oil & Gas Lease Bond Number 153571
Utah Oil & Gas Lease Bond 224351 (expiration date 06-30-2000)
Utah Bond of Lessee 203521

CONFIDENTIAL

IN ABOVE SPACE, DESCRIBE PROPOSED PROGRAM: If proposal is to deepen, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24. SIGNED Bruce Darlington TITLE Sr. Drilling Engineer DATE 02/05/1999

(This space for Federal or State office use.)

Federal Approval of this
Action is Necessary

PERMIT NO. 43-007-30555 APPROVAL DATE

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. CONDITIONS OF APPROVAL IF ANY:

APPROVED BY BRADLEY G. HILL TITLE RECLAMATION SPECIALIST III DATE 4/15/99

See Instructions On Reverse Side

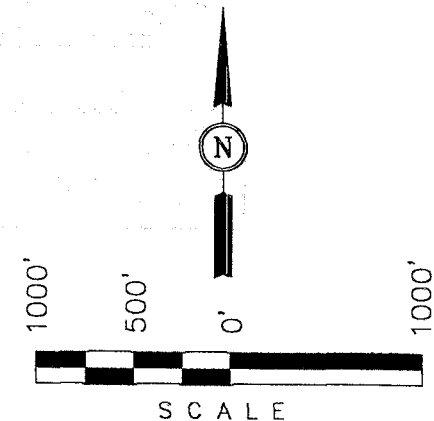
T14S, R10E, S.L.B.&M.

ANADARKO PETROLEUM CORP.

Well location, OLIVETO SWD #A-3, located as shown in the SW 1/4 NE 1/4 of Section 8, T14S, R10E, S.L.B.&M. Carbon County, Utah

BASIS OF ELEVATION

SPOT ELEVATION NEAR THE SOUTHEAST CORNER OF SECTION 34, T13S, R10E, S.L.B.&M. TAKEN FROM THE HELPER QUADRANGLE, UTAH, CARBON COUNTY, 7.5 MINUTE QUAD. (TOPOGRAPHIC MAP) PUBLISHED BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY. SAID ELEVATION IS MARKED AS BEING 6350 FEET.



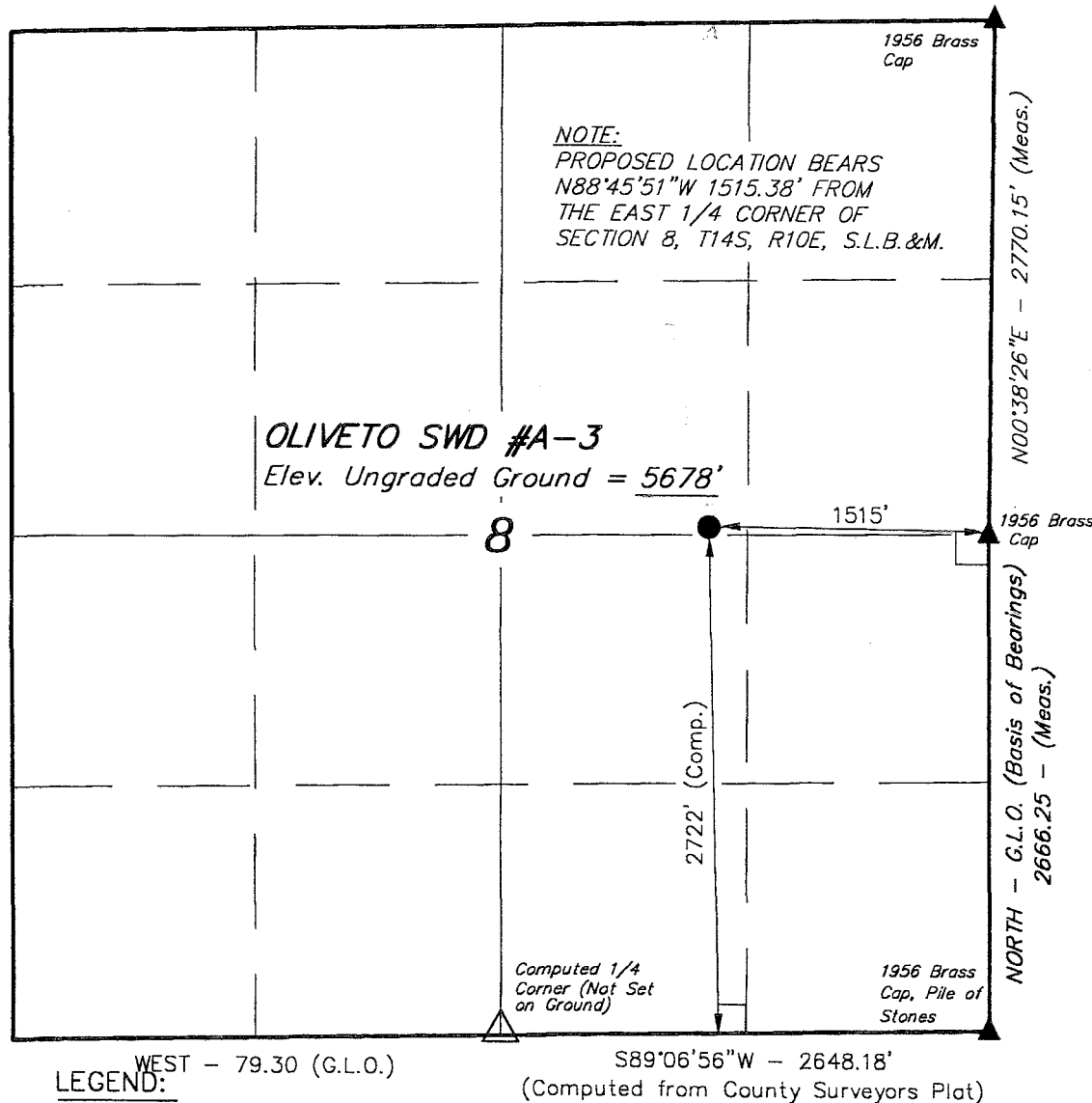
CERTIFICATE

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. NO. 161319

REGISTERED LAND SURVEYOR
REGISTRATION NO. 161319
STATE OF UTAH

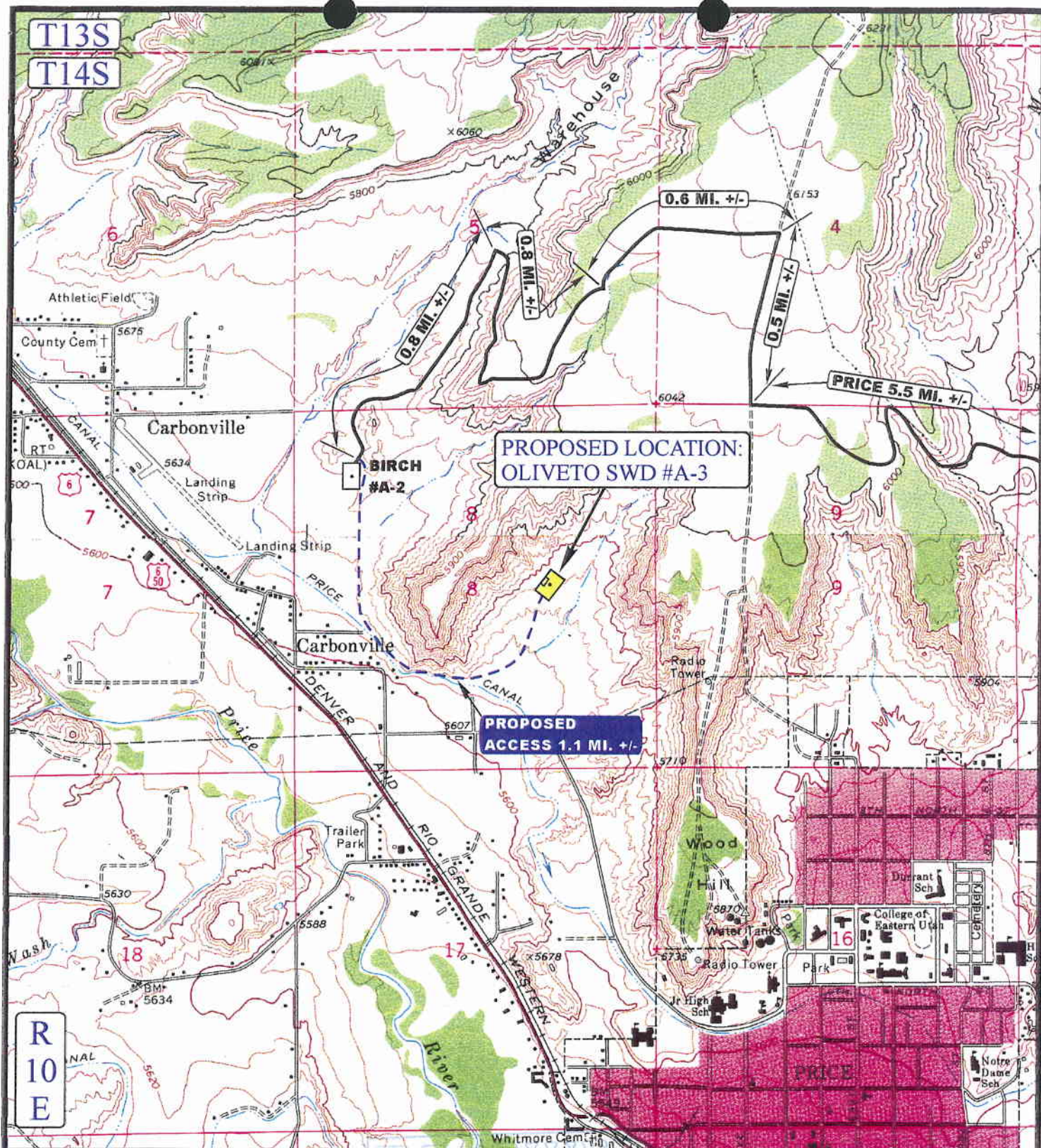
UINTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST - VERNAL, UTAH 84078
(801) 789-1017

| | | |
|--------------------------|----------------------------------|-------------------------|
| SCALE 1" = 1000' | DATE SURVEYED: 9-21-98 | DATE DRAWN: 10-12-98 |
| PARTY K.K. T.A. D.COX | REFERENCES G.L.O. PLAT | |
| WEATHER WARM | FILE ANADARKO PETROLEUM CORP. | |



LEGEND:

- └─┘ = 90° SYMBOL
- = PROPOSED WELL HEAD.
- ▲ = SECTION CORNERS LOCATED.



LEGEND:

--- PROPOSED ACCESS ROAD
 ——— EXISTING ROAD

ANADARKO PETROLEUM CORP.

OLIVETO SWD #A-3

SECTION 8, T14S, R10E, 6th P.M.

2722' FSL 1515' FEL

U
E
I
S

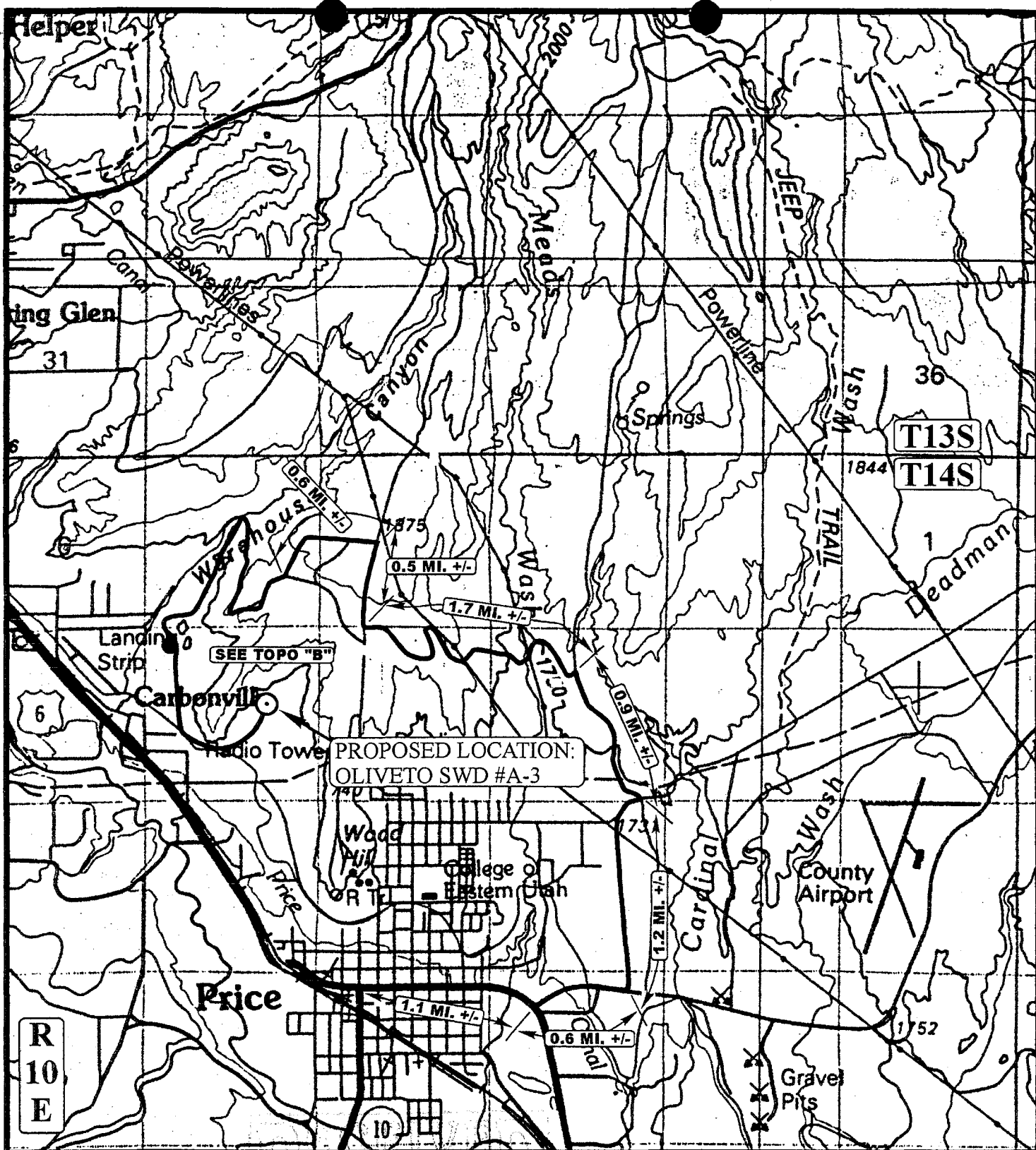
Uintah Engineering & Land Surveying
 85 South 200 East Vernal, Utah 84078
 (435) 789-1017 * FAX (435) 789-1813

TOPOGRAPHIC
 MAP

10 7 98
 MONTH DAY YEAR

SCALE: 1" = 2000' DRAWN BY: J.L.G. REVISED: 00-00-00

B
 TOPO



LEGEND:

○ PROPOSED LOCATION

ANADARKO PETROLEUM CORP.

OLIVETO SWD #A-3
SECTION 8, T14S, R10E, S.L.B.&M.
2722' FSL 1515' FEL

UELS

Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1018

TOPOGRAPHIC
MAP

10 7 98
MONTH DAY YEAR

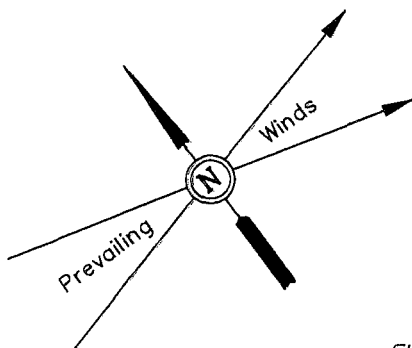
SCALE: 1"=4000' DRAWN BY: J.L.G. REVISED: 00-00-00

A
TOPO

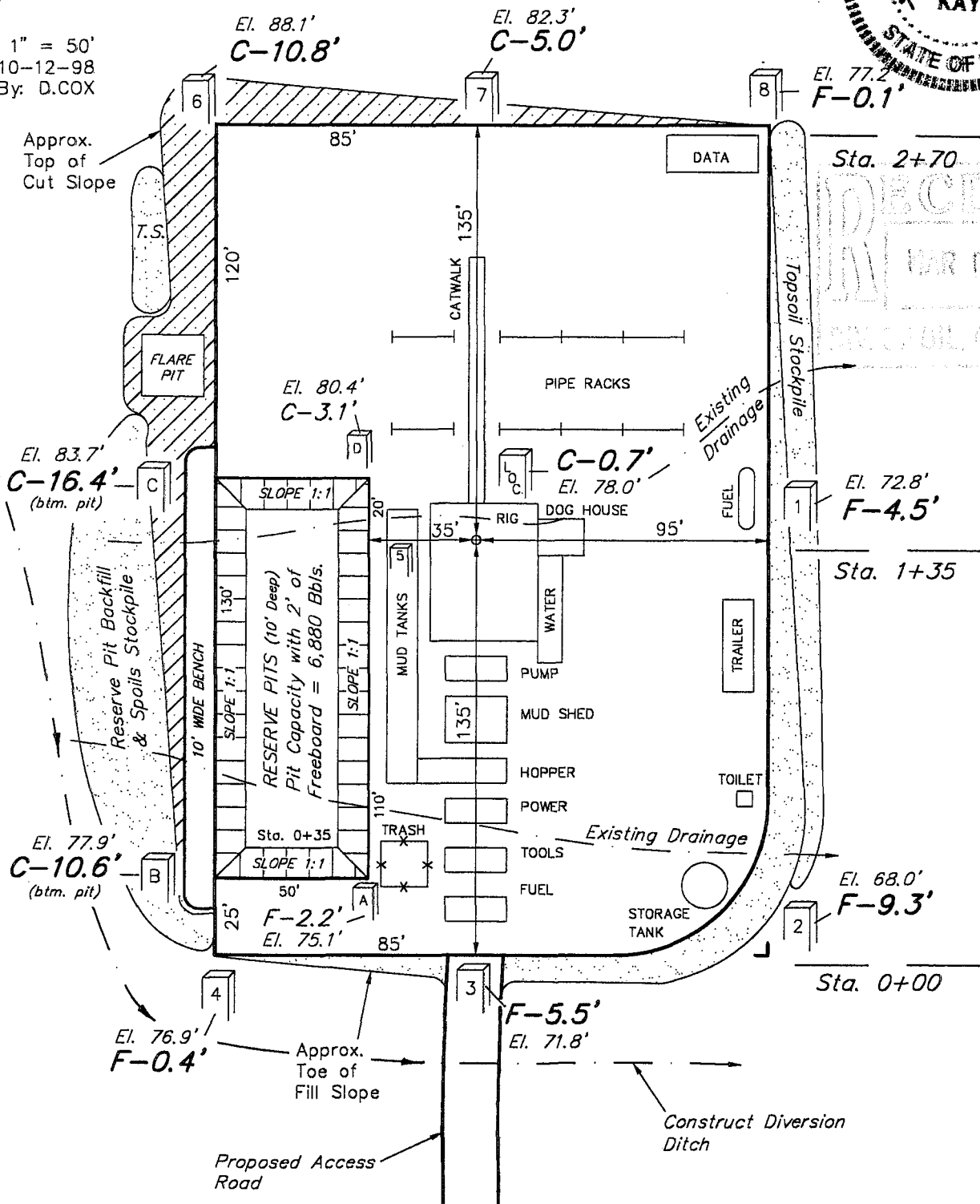
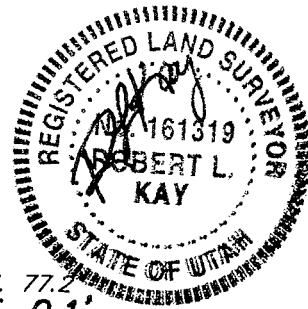
ANADARKO PETROLEUM CORP.

LOCATION LAYOUT FOR

OLIVETO SWD #A-3
SECTION 8, T14S, R10E, S.L.B.&M.
2722' FSL 1515' FEL



SCALE: 1" = 50'
DATE: 10-12-98
Drawn By: D.COX



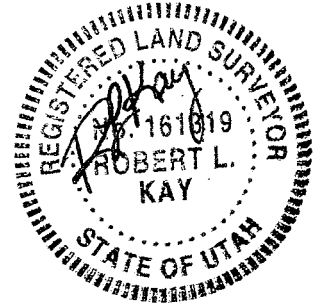
ELEV. UNGRADED GROUND AT LOC. STAKE = 5678.0'
ELEV. GRADED GROUND AT LOC. STAKE = 5677.3'

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East Vernal, Utah

ANADARKO PETROLEUM CORP.

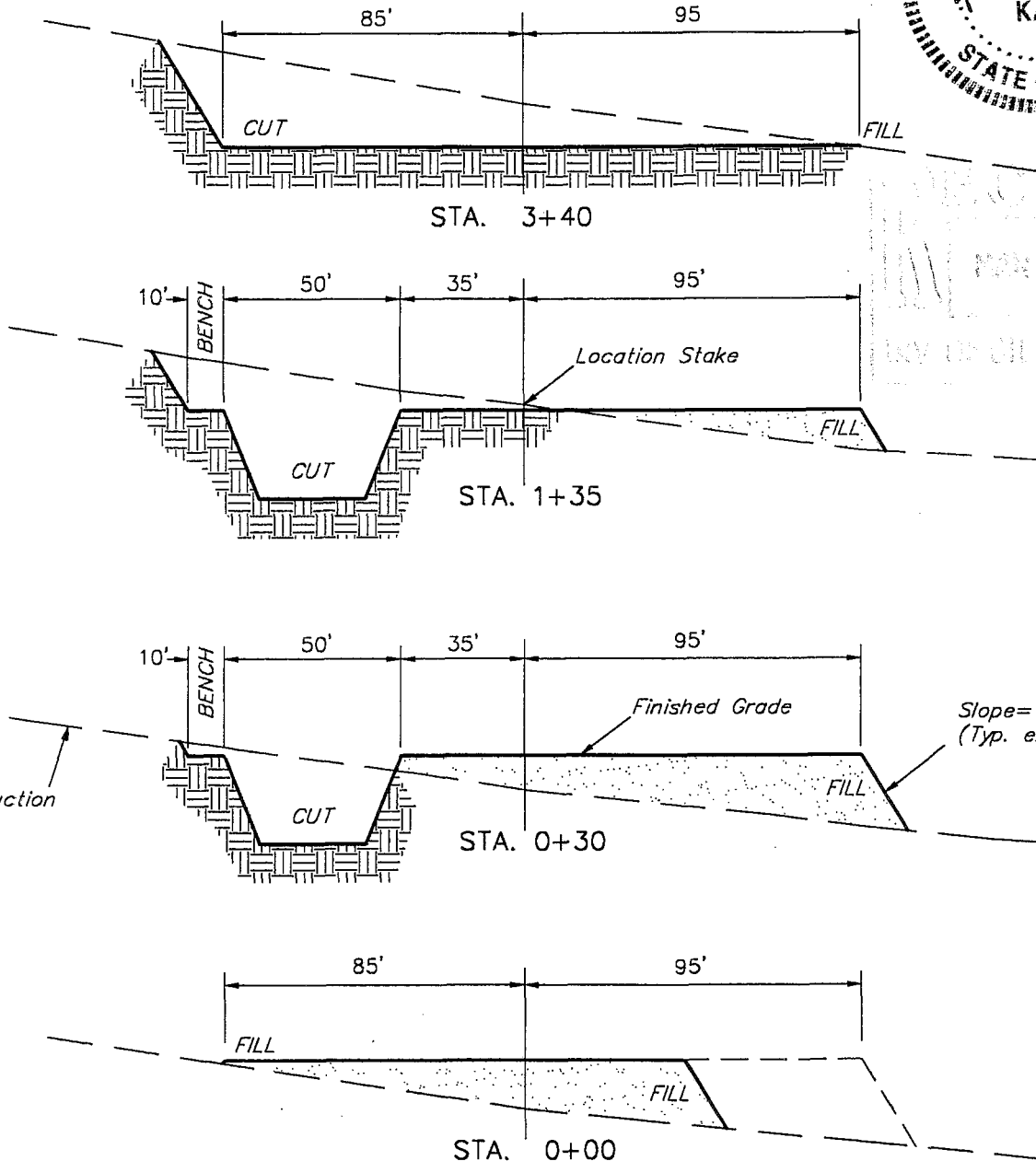
TYPICAL CROSS SECTIONS FOR

OLIVETO SWD #A-3
SECTION 8, T14S, R10E, S.L.B.&M.
2722' FSL 1515' FEL



1" = 20'
X-Section
Scale
1" = 50'

DATE: 10-12-98
Drawn By: D.COX



APPROXIMATE YARDAGES

CUT

(6") Topsoil Stripping = 900 Cu. Yds.

Remaining Location = 4,960 Cu. Yds.

TOTAL CUT = 5,860 CU.YDS.

FILL = 3,660 CU.YDS.

EXCESS MATERIAL AFTER
5% COMPACTION

= 2,010 Cu. Yds.

Topsoil & Pit Backfill
(1/2 Pit Vol.)

= 1,790 Cu. Yds.

EXCESS UNBALANCE
(After Rehabilitation)

= 220 Cu. Yds.

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East Vernal, Utah

WORKSHEET
APPLICATION FOR PERMIT TO DRILL

APD RECEIVED: 03/08/1999

API NO. ASSIGNED: 43-007-30555

WELL NAME: FEDERAL F-2 SWD
OPERATOR: ANADARKO PETROLEUM CORP (N0035)
CONTACT: Judy Davidson (281) 874-8766

AMENDED

PROPOSED LOCATION:
SESE 08 - T14S - R10E
SURFACE: 1201-FSL-0840-FEL
BOTTOM: 1201-FSL-0840-FEL
CARBON COUNTY
HELPER FIELD (018)

| | | |
|------------------------|----------|------|
| INSPECT LOCATN BY: / / | | |
| TECH REVIEW | Initials | Date |
| Engineering | | |
| Geology | | |
| Surface | | |

LEASE TYPE: FED
LEASE NUMBER: UTU-65762
SURFACE OWNER: Fee / Anadarko
PROPOSED FORMATION: NAVA per Op. 6-18-99
FC

RECEIVED AND/OR REVIEWED:

☒ Plat
☒ Bond: Fed ☒ Ind ☐ Sta ☐ Fee
(No. 53571)
☒ Potash (Y/N)
☒ Oil Shale (Y/N) *190-5(B)
☒ Water Permit
(No. PRWID)
☒ RDCC Review (Y/N)
(Date: _____)
N/A Fee Surf Agreement (Y/N)

LOCATION AND SITING:

___ R649-2-3. Unit
___ R649-3-2. General
☒ R649-3-3. Exception
___ Drilling Unit
Board Cause No: _____
Date: _____
___ R649-3-11. Directional Drill

COMMENTS: Need add'l info. "Ex. Loc." (Rec'd 6-21-99)
Need Presite. (Conducted 6-25-99)

STIPULATIONS: ① FEDERAL APPROVAL

② STATEMENT OF BASIS



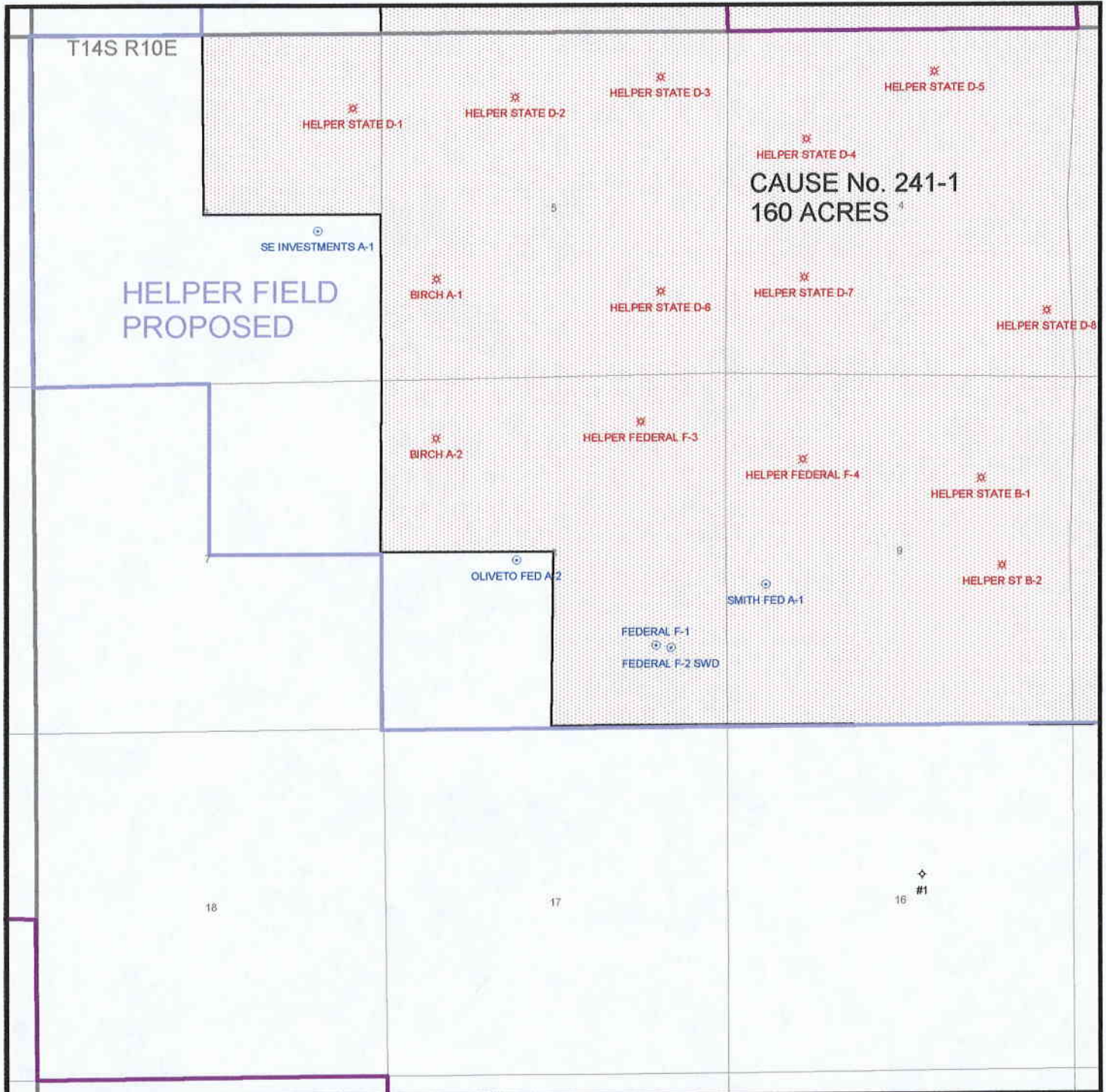
Division of Oil, Gas & Mining

OPERATOR: ANADARKO PETROLEUM (N0035)

FIELD: HELPER PROPOSED (018)

SEC. 8, TWP 14S, RNG 10E,

COUNTY: CARBON CAUSE No. : 241-1 160 ACRES



PREPARED
DATE: -JUNE-1999

WORKSHEET
APPLICATION FOR PERMIT TO DRILL

APD RECEIVED: 03/08/1999

API NO. ASSIGNED: 43-007-30555

WELL NAME: OLIVETO FED SWD A-3
OPERATOR: ANADARKO PETROLEUM CORP (N0035)
CONTACT: Judy Davidson (281) 874-8766

PROPOSED LOCATION: (Irreg. Sec.)
SWNE 08 - T14S - R10E
SURFACE: 2714 FNL -1515-FEL
BOTTOM: 2714 FNL -1515-FEL
CARBON COUNTY
HELPER PROPOSED FIELD (018)

LEASE TYPE: FED
LEASE NUMBER: UTU-65762
SURFACE OWNER: Federal

| | | |
|------------------------|----------|------|
| INSPECT LOCATN BY: / / | | |
| TECH REVIEW | Initials | Date |
| Engineering | | |
| Geology | | |
| Surface | | |

PROPOSED FORMATION: ~~FRSD~~ NAVA

RECEIVED AND/OR REVIEWED:

☒ Plat
☒ Bond: Federal ☒ State[] Fee[]
(No. 153571, etc.)
☒ Potash (Y/N)
☒ Oil Shale (Y/N) *190-5(B)
☒ Water Permit
(No. PLWD / City of Price)
☒ RDCC Review (Y/N)
(Date: _____)
☒ Fee Surf Agreement (Y/N)

LOCATION AND SITING:

____ R649-2-3. Unit _____
____ R649-3-2. General
☒ R649-3-3. Exception
____ Drilling Unit
Board Cause No: 241-1 (1607)
Date: 1-2-98

COMMENTS: Need add'l info. "Except. Loc / 241-1". (Rec'd 3-30-99) (Corrected Reg. 4-14-99)

STIPULATIONS: ① FEDERAL APPROVAL



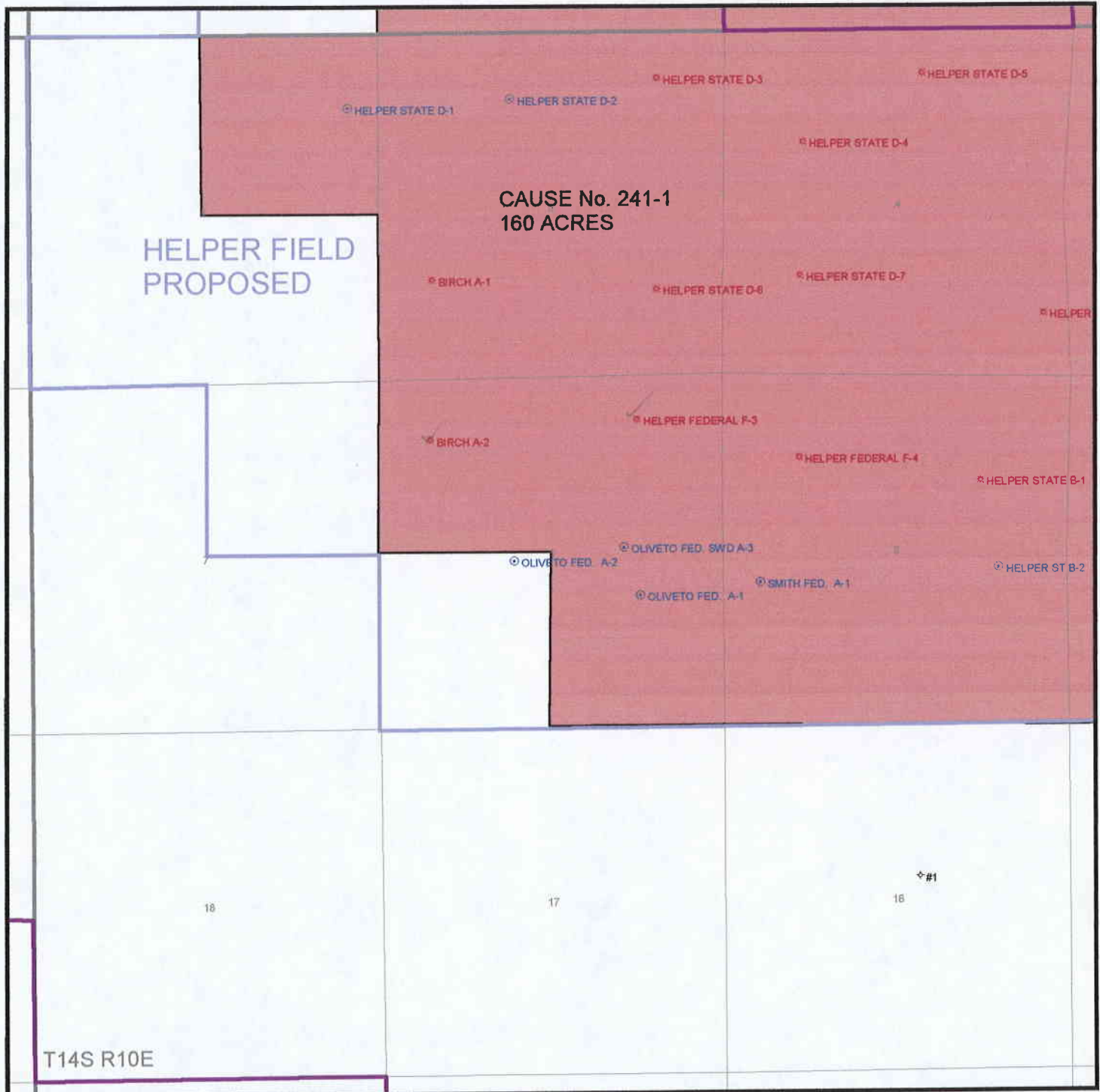
Division of Oil, Gas & Mining

OPERATOR: ANADARKO PETROLEUM (N0035)

FIELD: HELPER PROPOSED (018)

SEC. 8 & 9, TWP 14S, RNG 10E

COUNTY: CARBON CAUSE No: 241-1 160 ACRES



PREPARED
DATE: 16-MAR-1999

DIVISION OF OIL, GAS AND MINING
APPLICATION FOR PERMIT TO DRILL
STATEMENT OF BASIS

Operator Name: Anadarko Petroleum Corporation

Name & Number: Federal F-2

API Number: 43 - 007 - 30555

Location: 1/4, 1/4 SESE Sec. 8 T. 14 S R. 10 E

Geology/Ground Water:

There are no aquifers with high quality ground water expected to be encountered. The proposed casing and cement program should adequately isolate any zones of water penetrated.

Reviewer: Christopher Kierst

Date: 6/30/99

Surface:

The moderately to highly permeable soil and nearby affected population militates the need for the protection of a lined pit. Precipitation will be deflected around the location with berms and culverts. There are no nearby culinary or irrigation water supply wells. No water rights are recorded within 1/2 mile radius of the well site. Provision was made to ensure site rehabilitation, litter and waste control, preservation of drainage patterns and the integrity of local infrastructure, groundwater and other resources. Gathering systems will follow access roads. Power will come from a power pole just off the location. The location was photographed and characterized on 6/25/99. Overflow water from municipal water tank will be diverted around the location with a ditch.

Reviewer: Christopher Kierst

Date: 6/30/99

Conditions of Approval/Application for Permit to Drill:

1. Recommend culverts sufficient to manage expected runoff, standing and surface water in crossed drainages.
2. Berm location and pit.
3. Site infrastructure as per drilling location plat.
4. Minimum 12 mil synthetic lined pit.
5. Soil storage as per drilling location plat.

ON-SITE PREDRILL EVALUATION

Division of Oil, Gas and Mining

OPERATOR: Anadarko Petroleum Corporation

WELL NAME & NUMBER: Federal F-2 SWD

API NUMBER: 43-007-30555

LEASE: Fee FIELD/UNIT: Helper Field

LOCATION: 1/4, 1/4 SESE Sec: 8 TWP: 14S RNG: 10E 1201 FSL 840 FEL

LEGAL WELL SITING: 460 F SEC. LINE; 460 F 1/4, 1/4 LINE; 920 F ANOTHER WELL.

GPS COORD (UTM): X = 515,599; Y = 4,385,253

SURFACE OWNER: Anadarko Petroleum Corporation

PARTICIPANTS

C. Kierst (DOGM), J. Hartman (Anadarko), C. Colt (DWR), T. Hentine
(Uintah Engineering, D. Wilcox (Neilson Construction)).

REGIONAL/LOCAL SETTING & TOPOGRAPHY

Western margin of Colorado Plateau/~4.75 miles south of the 1000-1500'
Book Cliffs of the Tavaputs Plateau. Location is on the fringe of
Quaternary Slope Wash which occurs as broad, gently sloping (to
southwest) sheets locally containing valley fill and occur below,
between and beside low, Quaternary/Tertiary Pediment Mantle-veneered
benches, west, north and east of Price, Utah. Location is on open,
gently-sloping ground between fingers of the unnamed bench northwest
of Price city. Low erosional remnant hills nearby to southeast.

SURFACE USE PLAN

CURRENT SURFACE USE: Grazing, recreation and wildlife habitat

PROPOSED SURFACE DISTURBANCE: 270' X 169' pad with 130' X 39' X 10'
reserve pit included as part of the location. 0.1 mile of approach
road needed. Spoils and topsoil stockpiles and reserve pit backfill
pile will be stored outboard of the pad.

LOCATION OF EXISTING WELLS WITHIN A 1 MILE RADIUS: 3 Anadarko CBM
production wells and 4 Anadarko CBM wells in APD status.

LOCATION OF PRODUCTION FACILITIES AND PIPELINES: Water gathering
system will follow access road. Power lines will run from an nearby
existing power pole just off the location.

SOURCE OF CONSTRUCTION MATERIAL: Native material will be used to
gravel approach road and location. Any additional needs will be met
by quarrying from Anadarko's own permitted gravel pit.

ANCILLARY FACILITIES: None

WASTE MANAGEMENT PLAN:

Portable toilets to be emptied into the City sewage treatment system; garbage cans on location will be emptied into centralized dumpsters which will be emptied into an approved landfill. Reserve pit will be dried after use and then buried. Water produced during testing and completion will be stored in a synthetically-lined reserve pit and subsequently injected into a disposal well.

ENVIRONMENTAL PARAMETERS

AFFECTED FLOOD PLAINS AND/OR WETLANDS: Price Canal is ~1,100' southwest of the stake. Price River is ~3/4 mile southwest. Overflow water from a municipal water tank sited on a low bench east of the pad is flowing down a wash and through the location.

FLORA/FAUNA: Sage, greasewood, salina wild rye / birds, coyotes, rodents, raptors, reptiles.

SOIL TYPE AND CHARACTERISTICS: Unconsolidated, moderately-permeable soil developed on a Quaternary Slope Wash sheet overlying the Blue Gate Shale Member of the Cretaceous Mancos Shale. Grain sizes range from clay to boulders. (GM-SM)

SURFACE FORMATION & CHARACTERISTICS: Quaternary Slope Wash fringe (grain sizes range from clay to boulders) overlying the light gray, bentonitic Blue Gate Shale Member of the Mancos Shale.

EROSION/SEDIMENTATION/STABILITY: Stable

PALEONTOLOGICAL POTENTIAL: None observed.

RESERVE PIT

CHARACTERISTICS: 130' X 39' X 10' excavated pit bermed to deflect runoff.

LINER REQUIREMENTS (Site Ranking Form attached): Minimum 12 mil synthetic liner

SURFACE RESTORATION/RECLAMATION PLAN

SURFACE AGREEMENT: Surface owner agreement not needed because Anadarko is itself the owner.

CULTURAL RESOURCES/ARCHAEOLOGY: None needed - fee acreage.

OTHER OBSERVATIONS/COMMENTS

Items discussed included: 1) Location of power lines and gathering system. Drilling water will come from a City water system metered hydrant near the cemetery. F-2 and F-1 pads will butt against one another and be within the perimeter of the greater SWD location.

ATTACHMENTS:

4 photos (5-8)

Christopher Kierst
OGM REPRESENTATIVE

6/25/99 10:25 AM
DATE/TIME

**Evaluation Ranking Criteria and Ranking Score
For Reserve and Onsite Pit Liner Requirements**

| <u>Site-Specific Factors</u> | <u>Ranking</u> | <u>Site Ranking</u> |
|---|----------------|---------------------|
| Distance to Groundwater (feet) | | |
| >200 | 0 | |
| 100 to 200 | 5 | |
| 75 to 100 | 10 | |
| 25 to 75 | 15 | |
| <25 or recharge area | 20 | <u>0</u> |
| Distance to Surf. Water (feet) | | |
| >1000 | 0 | |
| 300 to 1000 | 2 | |
| 200 to 300 | 10 | |
| 100 to 200 | 15 | |
| < 100 | 20 | <u>0</u> |
| Distance to Nearest Municipal Well (feet) | | |
| >5280 | 0 | |
| 1320 to 5280 | 5 | |
| 500 to 1320 | 10 | |
| <500 | 15 | <u>0</u> |
| Distance to Other Wells (feet) | | |
| >1320 | 0 | |
| 300 to 1320 | 10 | |
| <300 | 20 | <u>0</u> |
| Native Soil Type | | |
| Low permeability | 0 | |
| Mod. permeability | 10 | |
| High permeability | 20 | <u>10</u> |
| Fluid Type | | |
| Air/mist | 0 | |
| F resh Water | 5 | |
| TDS >5000 and <10000 | 15 | |
| TDS >10000 or Oil Base | 20 | |
| Mud Fluid containing high levels of hazardous constituents | | <u>0</u> |
| Drill Cuttings | | |
| Normal Rock | 0 | |
| Salt or detrimental | 10 | <u>0</u> |
| Annual Precipitation (inches) | | |
| <10 | 0 | |
| 10 to 20 | 5 | |
| >20 | 10 | <u>5</u> |
| Affected Populations | | |
| <10 | 0 | |
| 10 to 30 | 6 | |
| 30 to 50 | 8 | |
| >50 | 10 | <u>10</u> |
| Presence of Nearby Utility Conduits | | |
| Not Present | 0 | |
| Unknown | 10 | |
| Present | 15 | <u>0</u> |
| Final Score (Level I Sensitivity) | | <u>25</u> |



Anadarko Federal F-2 SWD 4300730555 1201 FSL, 840 FEL, S. 8, T. 14 S., R. 10 E., Carbon County, Utah C. Kierst 6/25/99

UTAH DIVISION OF WATER RIGHTS
WATER RIGHT POINT OF DIVERSION PLOT CREATED TUE, JUN 22, 1999, 4:22 PM
PLOT SHOWS LOCATION OF 2 POINTS OF DIVERSION

PLOT OF AN AREA WITH A RADIUS OF 2640 FEET FROM A POINT
N 1201 FEET, W 840 FEET OF THE SE CORNER,
SECTION 8 TOWNSHIP 14S RANGE 10E SL BASE AND MERIDIAN

PLOT SCALE IS APPROXIMATELY 1 INCH = 1000 FEET

N O R T H

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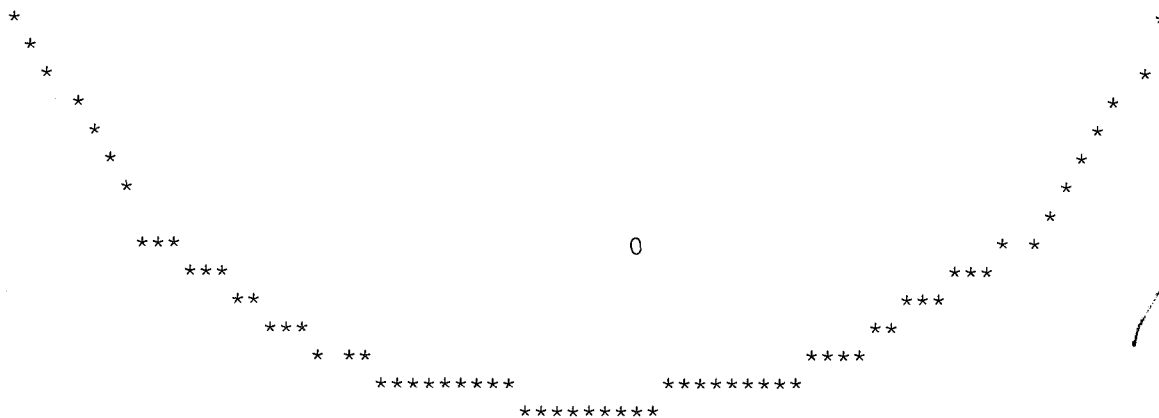
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UTAH DIVISION OF WATER RIGHTS
NWPLAT POINT OF DIVERSION LOCATION PROGRAM

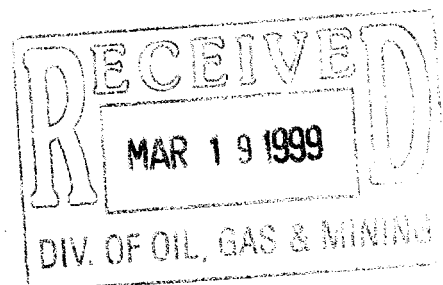
| MAP CHAR | WATER RIGHT | QUANTITY CFS | AND/OR AC-FT | SOURCE DESCRIPTION or WELL INFO DIAMETER DEPTH YEAR LOG NORTH EAST | POINT OF DIVERSION DESCRIPTION CNR SEC TWN RNG B&M |
|-------------|----------------|-----------------------------|-----------------|---|---|
| 0 | 91 2281 | .0000 | .00 | Price River | |
| | | WATER USE(S): STOCKWATERING | | | PRIORITY DATE: 00/00/18 |
| | | Pilling, Clarence Peter | | | Price |
| | | Route #1 | | | |
| 0 | 91 2281 | .0000 | .00 | Price River | |
| | | WATER USE(S): STOCKWATERING | | | PRIORITY DATE: 00/00/18 |
| | | Pilling, Clarence Peter | | | Price |
| | | Route #1 | | | |



March 15, 1999

State of Utah
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

Attention: Lisha Cordova



RE: Correction to Application for Permit to Drill
Oliveto Federal SWD A-3
Section 8, Township 14S, Range 10E
Lease UTU65762

Gentlemen:

Enclosed, in triplicate, is a corrected Drilling Plan for the Oliveto Federal SWD A-3.
Please include this in the Application for Permit to Drill.

Please call me at (281) 874-8766 if you require further information or have any
questions.

Sincerely,

A handwritten signature in cursive script that reads "Judy Davidson".

Judy Davidson
Regulatory Analyst

JD/me
enclosures

**DRILLING PLAN
TO ACCOMPANY APPLICATION FOR PERMIT TO DRILL**

Company: Anadarko Petroleum Corporation

Well: Oliveto Federal SWD A-3

Location: 2722' FSL & 1515' FEL
T14S R10E Sec 8
Carbon County, Utah

Lease: UTU-65762

Surface Elevation: 5678

A. Estimated Tops of Important Geologic Markers:

| | | | | | |
|----------------|---------|------------------|------|---------|------|
| Emery | Surface | Dakota Sandstone | 2113 | Curtis | 3983 |
| Bluegate Shale | 478 | Cedar Mountain | 2163 | Entrada | 4113 |
| Ferron Sand | 1578 | Buckhorn Cong. | 2893 | Carmel | 4763 |
| Ferron Coal | 1593 | Morrison | 2993 | Navajo | 5403 |
| Base of Ferron | 1723 | Salt Wash | 3383 | Keyenta | 5733 |
| Tununk Shale | 1813 | Summerville | 3663 | Wingate | 5818 |

4-1-99 Inj. Interval per Operator. *lc*

B. Estimated Depth at which Water, Oil, Gas or other Mineral-Bearing zones are expected to be encountered:

Gas-bearing Ferron Sandstone Member is expected to be encountered from: 1578 - 1723.

All fresh water zones and prospectively valuable mineral zones encountered during drilling will be recorded by depth and adequately protected. All significant oil and gas shows will be tested to determine commercial potential.

C. Pressure Control Equipment:

A 9" 3000 psi WP double gate hydraulic BOP with pipe rams and blind rams will be installed on the 8-5/8" casinghead. In addition to the BOP stack, a rotating head will be installed on top of the BOP to assist in safe air drilling operations. The BOP stack will be tested prior to drilling below intermediate casing. The ram preventers will be tested to 70% of the working pressure of the casinghead. The annular will be tested to 50% of its working pressure. Operational checks will be made daily or on trips. A BOP schematic is shown on attached Exhibit "A".

The BOP system will be consistent with API RP 53. Pressure tests will be conducted before drilling out from under all casing strings which are set and cemented in place. Blowout preventer controls will be installed prior to drilling the surface casing plug and will remain in use until the well is completed or abandoned. Preventers will be inspected and operated at least daily to ensure good mechanical working order. This inspection will be recorded on the daily drilling report. Preventers will be pressure tested before drilling casing cement plugs. The accumulator system will meet IADC guidelines concerning pump capacities, storage capacity, and reservoir volume. Closing unit fluid volume will be sufficient to pre-charge the system to operating pressure plus 50% excess. One set of controls will be in the doghouse on the rig floor and one set will be remote on the drilling pad.

D. Casing Program

| | |
|----------------------|--|
| Surface Casing: | 13-3/8", 48#, H40, STC new casing will be set at approximately 300'. |
| Intermediate Casing: | 8-5/8" 24#, K55, LTC, new casing will be set at approximately 2800'. |
| Production Casing: | 5-1/2" 15.5#, K55, LTC, new casing will be set at approximately 6200'. |

D. Casing Program (continued)

Casing Design Factors

The safety factors on casing strings will equal or exceed the following values:

| | |
|----------------|------|
| Collapse | 1.0 |
| Joint Strength | 1.6 |
| Burst | 1.33 |

E. Cement Program

- Surface - Cement will be circulated to the surface. Casing will be cemented with approximately 420 cu. ft. (350 sx, 15.6 ppg, 1.19 cf/sk) of API Class 'A' cement.
- Intermediate - Cement will be raised to the surface casing using an API Class 'A' cement lead volume of approximately 1500 cu. ft. (750 sx, 12.8 ppg, 2.0 cf/sk) and an API Class 'A' tail cement volume of approximately 300 cu. ft (250 sx, 15.6 ppg, 1.19 cf/sk).
- Production - Casing will be cemented back to intermediate 8-5/8" casing using API Class 'H' cement and a "DV" stage cementing collar with a two stage cement job. The actual cement volumes and DV stage cementing tool placement will be based upon actual depth and gauge determined from open hole logs.

Additional additives will be used to retard the cement, accelerate the cement, control lost circulation, or control fluid loss. All cementing will be done in accordance with API cementing practices.

F. Mud Program and Circulating Medium:

A truck-mounted air drilling rig will be used to drill the surface hole to 300' and to pre-set the surface casing before moving a drilling rig on location to drill the rest of the hole to TD.

An air or air/mist system will be used for drilling from below surface pipe at 300' to 2800.

An air/mist system will be used from 2800' to approximately 5000'. The hole will then be displaced with an 8.7 to 9.2 ppg Low Solids Non Dispersed mud. Bentonite gel will be the primary additive with minor additions of lime, caustic, soda ash, and polymer to control viscosity.

The mud/fluid system will be monitored visually and with a gas chromatograph detector.

G. Coring, Logging, and Testing Program:

- a. The following logging program is planned:
 1. SDL-GR-CAL over prospective intervals (300 to 2800' and 2800 to 6200').
 2. DIL- SP-GR-CAL over prospective intervals (2800' to 6200')
- b. A mud logging unit with chromatograph will be used from approximately 1000' to TD.
- c. After production casing is installed, a cement bond log will be run to determine the top of cement. Productive zones will then be perforated and tested. Water produced during testing will be contained in the temporary reserve pit.

H. Abnormal Conditions and Potential Hazards:

Abnormal conditions such as abnormal temperatures or pressures are not anticipated. Potential hazards such as H2S are also not anticipated.

March 4, 1999



State of Utah
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

Attention: Lisha Cordova

RE: Applications for Permit to Drill
Carbon County

Gentlemen:

Enclosed, in duplicate, are Applications for Permit to Drill (BLM Form 3160-3) for the following wells in Carbon County. These applications have also been submitted to the Bureau of Land Management District Office in Moab this date, with a copy to the Bureau of Land Management Field Office in Price.

Smith Federal A-1
Oliveto Federal A-1
Oliveto Federal A-2
Oliveto Federal SWD A-3

Estimated start-up date to begin drilling the first well is on or about April 16, 1999. Please call me at (281) 874-8766 if you require further information or have any questions.

Sincerely,

Judy Davidson
Regulatory Analyst

JD/me
enclosures

Stamp: RECEIVED
MAR 11 1999
BUREAU OF LAND MANAGEMENT
SALT LAKE CITY

**DRILLING PLAN
TO ACCOMPANY APPLICATION FOR PERMIT TO DRILL**

Company: Anadarko Petroleum Corporation

Well: Oliveto Federal SWD A-3

Location: 2722 ' FSL & 1515' FEL
T14S R10E Sec 8
Carbon County, Utah

Lease: UTU-65762

Surface Elevation: 5678

A. Estimated Tops of Important Geologic Markers:

| <u>GEOLOGIC MARKER</u> | <u>DEPTH</u> |
|------------------------|--------------|
| Emery | Surface |
| Bluegate Shale | 478 |
| Ferron SS Member | 1578 |
| Ferron Coal Top | 1593 |
| Base of Ferron Coal | 1723 |
| Tununk Shale | 1813 |

B. Estimated Depth at which Water, Oil, Gas or other Mineral-Bearing zones are expected to be encountered:

Gas-bearing Ferron Sandstone Member is expected to be encountered from: 1578 - 1723.

All fresh water zones and prospectively valuable mineral zones encountered during drilling will be recorded by depth and adequately protected. All significant oil and gas shows will be tested to determine commercial potential.

C. Pressure Control Equipment:

A 9" 3000 psi WP double gate hydraulic BOP with pipe rams and blind rams will be installed on the 8-5/8" casinghead. In addition to the BOP stack, a rotating head will be installed on top of the BOP to assist in safe air drilling operations. The BOP stack will be tested prior to drilling below surface casing. The ram preventers will be tested to 70% of the working pressure of the casinghead. The annular will be tested to 50% of its working pressure. Operational checks will be made daily or on trips. A BOP schematic is shown on attached Exhibit "A".

The BOP system will be consistent with API RP 53. Pressure tests will be conducted before drilling out from under all casing strings which are set and cemented in place. Blowout preventer controls will be installed prior to drilling the surface casing plug and will remain in use until the well is completed or abandoned. Preventers will be inspected and operated at least daily to ensure good mechanical working order. This inspection will be recorded on the daily drilling report. Preventers will be pressure tested before drilling casing cement plugs. The accumulator system will meet IADC guidelines concerning pump capacities, storage capacity, and reservoir volume. Closing unit fluid volume will be sufficient to pre-charge the system to operating pressure plus 50% excess. One set of controls will be in the doghouse on the rig floor and one set will be remote on the drilling pad.

D. Casing Program

Surface Casing: 8-5/8", 24#, J55, LTC new casing will be set at approximately 300'.
Production Casing: 5-1/2" 17#, N80, LTC, new casing will be set at TD if productive.

D. Casing Program (continued)

Casing Design Factors

The safety factors on casing strings will equal or exceed the following values:

| | |
|----------------|------|
| Collapse | 1.0 |
| Joint Strength | 1.6 |
| Burst | 1.33 |

E. Cement Program

Surface - Cement will be circulated to the surface. Casing will be cemented with approximately 200 cu. ft. of API Class 'G' cement.

Production - Casing will be cemented with approximately 300 cu. ft. of API Class 'G' cement. The actual cement volume will be based upon hole depth and gauge, and will be determined from logs.

Additional additives will be used to retard the cement, accelerate the cement, control lost circulation, or control fluid loss. All cementing will be done in accordance with API cementing practices.

The cement program will be modified to cover and adequately protected the Mancos Shale if water is encountered while drilling.

F. Mud Program and Circulating Medium:

A truck-mounted air drilling rig will be used to drill the surface hole to 300' and to pre-set the surface casing before moving a drilling rig on location to drill the rest of the hole to TD. An air or air/mist system will be used for drilling from below surface pipe at 400' to TD. The mud/fluid system will be monitored visually and with a gas chromatograph detector.

G. Coring, Logging, and Testing Program:

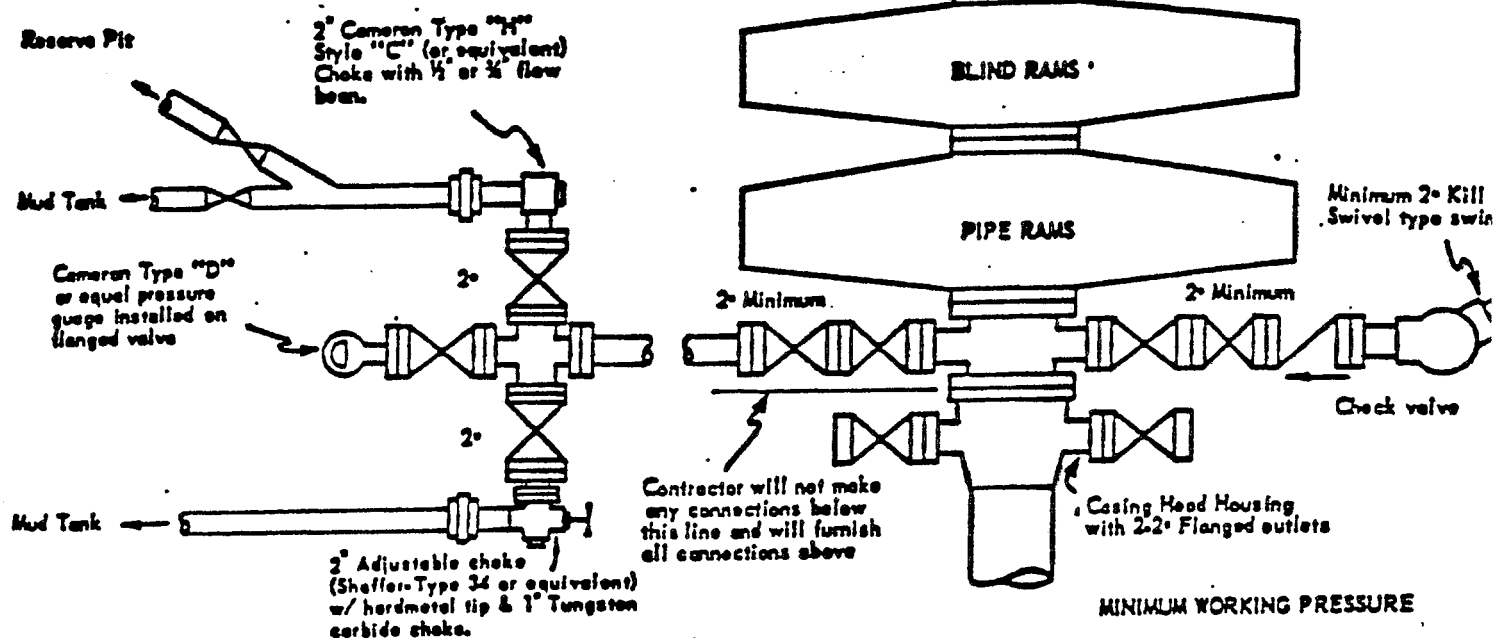
- a. Rotary sidewall coring in the Ferron Sandstone interval may be performed, depending upon shows and hole conditions.
- b. DST's may be run depending upon shows.
- c. The following logging program is planned:
 1. SDL-GR-CAL over prospective intervals..
 2. DIL- SP-GR-CAL over prospective intervals
- d. A mud logging unit with chromatograph will be used from approximately 1000' to TD.
- e. After production casing is installed, a cement bond log will be run to determine the top of cement. Productive zones will then be perforated and swab tested. Water produced during testing will be contained in the temporary reserve pit. All produced oil will be stored and sold. Gas will be flared during testing.

H. Abnormal Conditions and Potential Hazards:

Abnormal conditions such as abnormal temperatures or pressures are not anticipated. Reservoir pressure is only anticipated to be 1200 psi. Potential hazards such as H₂S are also not anticipated.

Base at rotary table
or floor beams

Minimum, 6 inches



MINIMUM BLOWOUT PREVENTER
REQUIREMENTS - NORMAL
PRESSURE SERVICE

SURFACE USE PLAN

Anadarko Petroleum Corporation
Ferron Natural Gas Project
Helper Field
Carbon Co., Utah

1. Existing Roads: (Please reference Topo, Access, and Area Map)

- a. Location of the proposed well is approximately 2-3 miles north of Price, Utah.
- b. Proposed route to location: (Reference Topo, Access, and Area Map).
- c. Location and description of roads in the area: (Reference Topo, Access, and Area Map).
- d. Plans for improvement and/or maintenance of existing roads: The existing roads will be maintained in the same or better condition as existed prior to the commencement of operations and in accordance with the Ferron Natural Gas EIS.

2. Planned Access Roads:

- a. Access Roads will be constructed using standard equipment and techniques such as the crown-and-ditch method (BLM 1989). Heavy equipment will clear vegetation and topsoil materials from the road surface. Both materials will be windrowed for future redistribution during reclamation. All roads will be constructed with , adequate drainage and erosion control features/structures (e.g., cut and fill slopes and drainage ditch stabilization, relief and drainage culverts, water bars, wing ditches, and rip-rap). When needed, four inches of sand and gravel will be placed on newly constructed roads to provide a year round travel way surface. The maximum disturbed width will not exceed 30' with a sixteen foot running surface. Dust will be controlled by the use of water or an approved dust retardant, as directed by the Price Field Office Manager. All roads will be maintained in as good or better condition than existing condition and in accordance with the Ferron Natural Gas EIS.
- b. Maximum grades: Maximum road grades will not exceed 15%.
- c. Location: New roads that will be constructed for access off of the existing roads are flagged. (Refer to isubmitted Topographic, Access, and Area Maps).
- d. Drainage: The road surface will be center crowned with ditches on each side of road. Slopes will have a maximum slope of 3:1.
- e. Culverts will be used where necessary during the drilling phase of operations. Further evaluation will be made for the additions of culverts if the road is to have long-term use.
- f. Surface materials (source): Surface materials will be most likely not be required to be transported to the access road or drillpad for construction purposes. However, if gravel is required, the dirt contractor will be responsible for locating and permitting of any necessary construction material.

3. Locations of existing wells:

Helper Field - Ferron Natural Gas Project
Existing Well Locations

| Well Name | Location | Sec | Twn | Rng |
|--------------------|-----------------------------|------------|------------|------------|
| Federal A-1 | SW 1141' FSL & 1325' FWL | 23 | 13S | 10E |
| Federal A-2 | 1464 FSL & 2244 FWL | 22 | 13S | 10E |
| Federal A-3 | 1271' FSL & 324' FEL | 22 | 13S | 10E |
| Federal B-5 | 1139 FNL & 629 FEL | 27 | 13S | 10E |
| Federal C-1 | 2169' FNL & 697' FEL | 22 | 13S | 10E |
| Federal B-1 | 1650 FSL & 2310 | 33 | 13S | 10E |
| Federal D-1 | SW NE 1413' FNL & 1567' FEL | 26 | 13S | 10E |
| State A-1 | NW 1621' FNL & 2019' FWL | 3 | 14S | 10E |
| State D-7 | SW 1500' FSL & 1200' FWL | 4 | 14S | 10E |
| Birch A-1 | SW 1507' FSL & 856' FWL | 5 | 14S | 10E |
| State D-3 | 691' FNL & 1006' FEL | 5 | 14S | 10E |
| State D-6 | 1300' FSL & 999' FEL | 5 | 14S | 10E |
| Helper Federal F-3 | 698' FNL & 1302' FEL | 8 | 14S | 10E |
| Helper Federal F-4 | 1294' FNL & 1182' FWL | 9 | 14S | 10E |
| Helper State A-2 | 1321' FNL & 464' FEL | 3 | 14S | 10E |
| Helper State A-3 | 1200' FNL & 900' FWL | 2 | 14S | 10E |
| Helper State A-4 | 1100' FNL & 1700' FEL | 2 | 14S | 10E |
| Helper State A-5 | 1816' FSL & 2201' FWL | 3 | 14S | 10E |
| Helper State A-6 | 2288' FSL & 820' FEL | 3 | 14S | 10E |
| Helper State A-7 | 1635' FSL & 1497' FWL | 2 | 14S | 10E |
| Helper State A-8 | 1700' FSL & 2000' FEL | 2 | 14S | 10E |
| Helper State A-9 | 1335' FNL & 1602' FWL | 10 | 14S | 10E |
| Helper State B-1 | 1595' FNL & 1406' FEL | 9 | 14S | 10E |
| Helper State D-4 | 1681' FNL & 1232' FWL | 4 | 14S | 10E |
| Helper State D-5 | 644' FNL & 2165' FEL | 4 | 14S | 10E |
| Helper State D-8 | 1059' FSL & 395' FEL | 4 | 14S | 10E |
| Birch A-2 | 945' FNL & 825' FWL | 8 | 14S | 10E |
| Helper SWD #1 | 1131' FSL & 2194' FWL | 3 | 14S | 10E |
| HELPER STATE A-10 | 1275' FNL & 2306' FEL | 10 | 14S | 10E |
| HELPER STATE A-11 | 1450' FNL & 1206' FWL | 11 | 14S | 10E |
| HELPER STATE A-12 | 2130' FSL & 1180' FWL | 10 | 14S | 10E |
| HELPER STATE A-13 | 2431' FSL & 736' FEL | 10 | 14S | 10E |
| HELPER STATE B-2 | 2438' FSL & 1090' FEL | 9 | 14S | 10E |
| HELPER STATE D-1 | 1131' FNL & 429' FEL | 6 | 14S | 10E |
| HELPER STATE D-2 | 1000' FNL & 2058' FWL | 5 | 14S | 10E |
| VEA A-1 | 1731' FNL & 1291' FWL | 32 | 13S | 10E |
| VEA A-2 | 1307' FNL & 842' FEL | 32 | 13S | 10E |
| VEA A-3 | 700' FSL & 1641' FWL | 32 | 13S | 10E |
| VEA A-4 | 1000' FNL & 2058' FWL | 32 | 13S | 10E |
| CHUBBUCK A-1 | 2017' FSL & 676' FEL | 31 | 13S | 10E |

4. Location of Tank Batteries and Production Facilities:

All permanent (on site for six months or longer) structures constructed or installed (including oil well pumpjacks) will be painted a flat, non-reflective, earthtone color to match the standard environmental colors, as determined by the Rocky Mountain 5-State Interagency Committee and in accordance with the EIS for the Ferron Natural Gas Project. This will include all facilities except those required to comply with O.S.H.A. (Occupational Safety and Health Act) regulations. These will be painted the color stipulated by O.S.H.A. All facilities will be painted within six months of installation.

All site security guidelines identified in 43 CFR 3162.7 regulations will be adhered to.

If at any time, any off-lease storage, off-lease measurement, or commingling on-lease or off-lease occurs, there shall first be prior written approval from the AO.

Gas meter runs for each well, if needed, will be located within 500 feet of the wellhead. the gas flowline will be buried from the wellhead to the meter and 500 feet downstream of the meter run or any production facilities. Meter runs will be housed and/or fenced.

The oil and gas measurement facilities will be installed on each well location. The oil and gas meters will be calibrated in place prior to any deliveries. Test for meter accuracy will be conducted monthly for the first three months on new meter installations and at least quarterly thereafter. The AO will be provided with a date and time for the initial meter calibration and all future meter proving schedules. A copy of the meter calibration reports will be submitted to Price Field Office. All meter measurement facilities will conform with the API standards for liquid hydrocarbons and the AGA standard for natural gas measurement.

5. Location and Type of Water Supply:

Water supply for drilling and completion purposes will be furnished by a water hauler and will be obtained from the Price River Municipal Water District located nearby.

6. Source of Construction Material:

Native material will be used for road surfacing and pad construction. Should additional construction material be required, it will be the responsibility of the dirt contractor to locate and permit (if necessary) use of that material. The use of materials under BLM jurisdiction will conform to 43 CFR 3610.2-3 and the EIS for the Ferron Natural Gas Project..

7. Methods of Handling Waste Disposal

All reserve pits will be lined.

Produced waste water will be confined to a lined pits for a period not to exceed 90-days after initial production.

Trash will be confined in covered containers and hauled to an approved landfill. Burning of waste or oil is not approved, and spoil material will be kept on site for recontouring.

No bore holes will be used for disposal of waste materials. Human waste will be contained and will be disposed of at an approved sanitary landfill.

8. Ancillary Facilities:

Associated roads, pipelines, and electric lines will be installed as per attached Figure 2-1.

9. Wellsite Layout:

Please refer to the submitted site layout diagram.

The locations and access roads will be cleared of trees prior to any construction. Stumps will be scattered or buried in an area designated by the BLM. Any stump left in place will be cut so that the stump height does not exceed 12 inches. All slash less than four inches in diameter will be chipped or scattered outside the cleared area and must be within 24 inches of the ground at all points. All material four inches in diameter or greater will be removed from Federal land, unless otherwise directed. All of the above will take place prior to placement of drilling facilities.

Topsoil and vegetation will be stripped together to a depth of 6 to 8 inches and stockpiled by wind-row on the northeast edge of the location. No topsoil stripping will be allowed when soils are moisture saturated to a depth of 3 inches, or frozen below the stripping depth.

The reserve pit will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. Fencing will be four strands of barbed wire or 48-inch woven wire with one strand of barbed wire above the woven wire. All corners will be braced with a wooden H-type brace. The fence construction will be on cut or undisturbed ground and the fence will be maintained in a livestock tight condition.

10. Plans for Restoration of Surface:

The Price Field Office Manager will be notified at least 24-hours prior to commencing reclamation work.

Immediately upon completion of drilling, the location and surrounding area will be cleared of all debris, materials, trash, and junk not required for production.

Before any dirt work to restore the location takes place, the reserve pit must be completely dry and all cans, barrels, pipe, etc. will be removed.

If well is completed as a producer:

Unneeded areas of the location will be reclaimed as soon as the reserve pit has dried. The access road will be upgraded and maintained as necessary to prevent soil erosion and accommodate year-round traffic. Reshape areas unnecessary to operations, rip or disk on the contour, and seed all disturbed area outside the work area according to the seed mixture specified in the EIS for the Ferron Natural Gas Project. Save the topsoil for use during final reclamation unless the site can be recontoured to blend with the natural topography as required for final abandonment. Perennial vegetation must be established. Additional work will be required in case of seeding failures. All permanent facilities placed on the locations will be painted to blend with the natural environment.

10. Plans for Restoration of Surface (Continued):

If well is abandoned/dry hole:

Restore the access road and location to blend with the natural topography. During reclamation of the site, push the fill material into cuts and up over the backslope. Leave no depressions that will trap water or form ponds. Distribute topsoil evenly over the locations and re-seed according to the EIS for the Ferron Natural Gas Project. The access roads and locations will be ripped or disked prior to seeding.

Prepare seed-bed by contour cultivating four to six inches deep. Drill seed 1/2 to 1 inch deep following the contour. In areas that cannot be drilled, broadcast seed at 1.5 times the application rate and cover 1/2 to 1 inch deep with a harrow or drag-bar.

Fall seeding will be completed after September 1 and prior to ground frost. Spring seeding will be completed after the frost has left the ground and prior to June 1.

11. Surface and Minerals Ownership:

The surface and the minerals are owned by the United States of America, Department of the Interior, Bureau of Land Management.

12. Other Information:

There will be no deviation from the proposed drilling and/or workover program without prior approval from the AO. Safe drilling and operating practices must be observed. All wells whether drilling, producing, suspended, or abandoned, will be identified in accordance with 43 CFT 3162.2 and in accordance with the EIS for the Ferron Natural Gas Project.

"Sundry Notice and Report on Wells" (Form 3160-5) will be filed for approval for all changes of plans and other operations in accordance with 43 CFR 3162.2.

The dirt contractor will be provided with an approved copy of the APD & Surface Use Plan.

An archaeology survey for the proposed well has been performed by Montgomery & Associates and this survey has been submitted to the Utah State Historical Preservation Office (SHPO), Price District BLM, Moab District BLM and the Price Field Office.

The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts or fossils. The Operator will immediately bring to the attention of the Price Field Office Manager any and all antiquities or other objects of historic or scientific interest including, but not limited to, historic or prehistoric ruins, artifacts, or fossils discovered as a result of operations under this permit. The operator will immediately suspend all activities in the area of the object and will leave such discoveries intact until told to proceed by the Price Field Office Manager. Notice to proceed will be based upon evaluation of the cultural significance of the object. Evaluation will be by a qualified professional selected by the Price Field Office Manager from a Federal Agency insofar as practical. When not practical, the Operator will follow the mitigation requirements set forth by the Price Field Office Manager concerning protection, preservation, or disposition of any sites or material discovered. Within five working days the Price Field Office Manager will inform the Operator as to:

12. Other Information (Continued):

Whether materials appear eligible for the National Register of Historic Places;

the mitigation measure(s) the Operator will likely have to undertake before the site

can be used (assuming in situ preservation is not necessary); and,

a time frame for the Price Field Office Manager to complete an expedited review under 36 CFR 800.11 to conform, through the State Historic Preservation Officer, that the findings of the Price Field Office Manager are correct and that mitigation is appropriate.

If the Operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the Price Field Office Manager will assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, in those situations where the Price Field Office Manager determines that mitigation, data recovery and/or salvage excavations are necessary, the Operator will bear the cost. The Price Field Office Manager will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Price Field Office Manager that the required mitigation has been completed, the Operator will then be allowed to resume construction.

13. Lessee's or Operator's Representatives and Certification:

REPRESENTATIVE

Name: Bruce Darlington
Phone: 281-874-1673
Address: Anadarko Petroleum Corporation
17001 Northchase Drive
Houston, Texas 77060

CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drillsites and access routes, that I am familiar with the conditions which currently exist, that the statements made in this plan are to the best of my knowledge, true and correct, and that the work associated with the operations proposed herein will be performed by

ANADARKO PETROLEUM CORPORATION

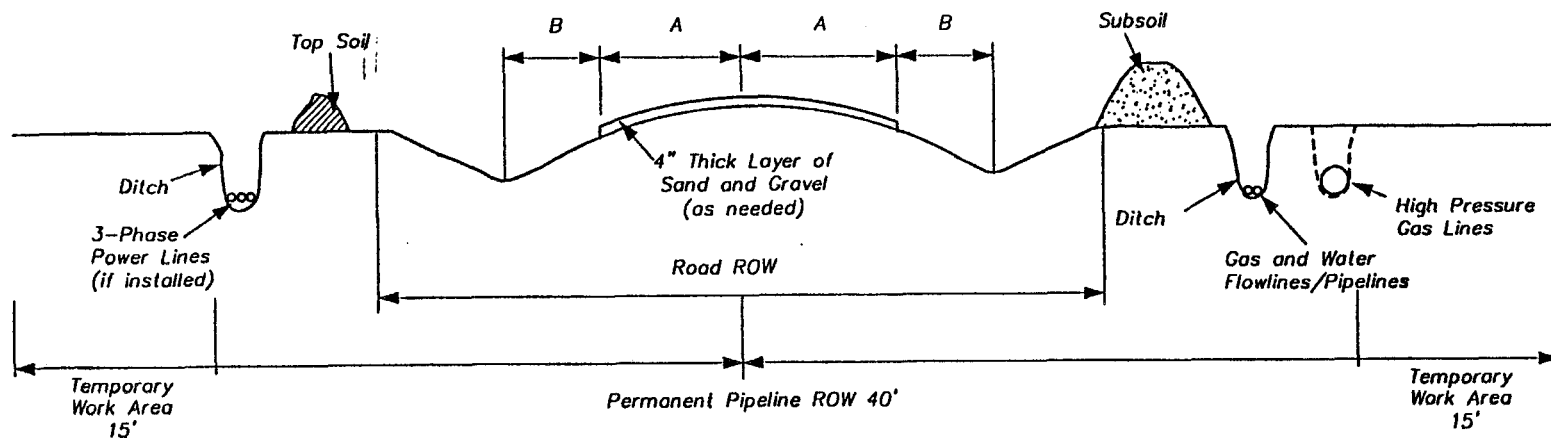
and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

02-03-99

Date



Bruce Darlington
Sr. Drilling Engineer



| | Surfaced Travel Way Width (ft.) | A (ft.) | B (ft.) | Approximate Disturbance Width (ft.) | Total ROW Width (ft.) |
|-------------------|---------------------------------------|------------|------------|---|-----------------------------|
| Resource Road | 16 | 8 | 4 | 70 | 40 |
| Local Road | 20 | 10 | 4 | 70 | 40 |
| Collector Road | 24 | 12 | 4 | 70 | 40 |

Not To Scale

Figure 2-1
Typical Roadbed
and Pipeline/Utility Trench Cross Section



17001 NORTHCHASE DRIVE, HOUSTON, TX 77060
(281) 875-1101

February 11, 1999

Bureau of Land Management
82 East Dogwood
Moab, Utah 84532

RE:

| Well Name | Location At Surface | | | | Sec | Twn | Rng | Lease |
|-------------------------|----------------------------|-----|------|-----|------------|------------|------------|--------------|
| Smith Federal A-1 | 2159 | FSL | 611 | FWL | 9 | 14S | 10E | UTU-65762 |
| Oliveto Federal A-1 | 1993 | FSL | 1250 | FEL | 8 | 14S | 10E | UTU-65762 |
| Oliveto Federal A-2 | 2569 | FSL | 2067 | FWL | 8 | 14S | 10E | UTU-65762 |
| Oliveto Federal SWD A-3 | 2722 | FSL | 1515 | FEL | 8 | 14S | 10E | UTU-65762 |

To Whom it May Concern:

Please be advised that Anadarko Petroleum Corporation is considered to be the operator of the subject wells and is responsible under terms and conditions of the lease for the operations conducted on the leased lands. Bond coverage for these subject wells is provided by BLM Bond No. 153571 via surety consent as provided for in 43 CFR 3104.2.

The aforementioned operator and bond will be held liable until the provisions of 43 CFR 3106.7-2 continuing responsibility are met.

Sincerely,

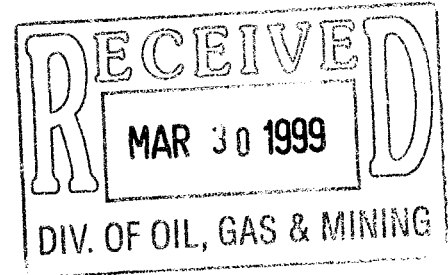
A handwritten signature in black ink, appearing to read "Bruce Darlington".

Bruce Darlington
Sr. Drilling Engineer



March 25, 1999

State of Utah
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-6801



Attention: Lisha Cordova

RE: Oliveto Federal A-3 SWD
Injection Well
Section 8, Township 14S, Range 10E

Gentlemen:

In accordance with Rule 649-3-3, Exception to Location and Siting of Wells, Anadarko Petroleum Corporation hereby requests a location exception for the Oliveto Federal A-3 SWD in Carbon County, Utah. This location exception is requested due to topography in this area which mandates that this well be positioned 2714' FNL & 1515' FEL of Section 8, Township 14S, Range 10E. In addition, placing the well at this location keeps it out of sight of the nearby residential area. Anadarko is its own offset operator and waives its objection to this exception.

Please call me at (281) 874-8766 if you require further information or have any questions.

Sincerely,

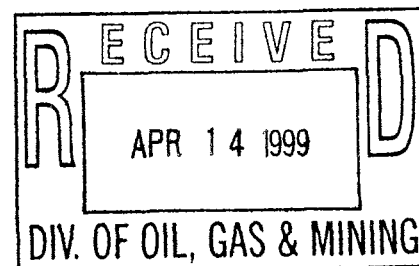
Judy Davidson
Regulatory Analyst

JD/me



April 12, 1999

State of Utah
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-6801



Attention: Lisha Cordova

RE: Correction to Exception to Location, Rule 649-3-3
Oliveto Federal A-3 SWD
Injection Well
Section 8, Township 14S, Range 10E

Gentlemen:

In accordance with Rule 649-3-3, Exception to Location and Siting of Wells, Anadarko Petroleum Corporation hereby requests a location exception for the Oliveto Federal A-3 SWD (Injection Well) in Carbon County, Utah. This location exception is requested due to topography in this area which mandates that this well be positioned 2714' FNL & 1515' FEL of Section 8, Township 14S, Range 10E. In addition, placing the well at this location keeps it out of sight of the nearby residential area. Anadarko is its own offset operator and waives its objection to this exception. There are no other owners within 460' of this proposed wellsite.

Please call me at (281) 874-8766 if you require further information or have any questions.

Sincerely,

Judy Davidson
Regulatory Analyst

JD/me



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Kathleen Clarke
Executive Director

Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210

PO Box 145801

Salt Lake City, Utah 84114-5801

801-538-5340

801-359-3940 (Fax)

801-538-7223 (TDD)

April 15, 1999

Anadarko Petroleum Corporation
17001 Northchase Drive
Houston, Texas 77060

Re: Oliveto Federal SWD A-3 Well, 2714' FNL, 1515' FEL, SW NE, Sec. 8, T. 14 S.,
R. 10 E., Carbon County, Utah

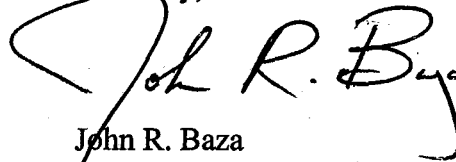
Gentlemen:

Pursuant to the provisions and requirements of Utah Code Ann. 40-6-1 et seq., Utah Administrative Code R649-3-1 et seq., and the attached Conditions of Approval, approval to drill the referenced well is granted.

Appropriate information has been submitted to DOGM by the operator and administrative approval of the requested exception location is hereby granted.

This approval shall expire one year from the above date unless substantial and continuous operation is underway, or a request for extension is made prior to the expiration date. The API identification number assigned to this well is 43-007-30555.

Sincerely,



John R. Baza
Associate Director

lwp

Enclosures

cc: Carbon County Assessor
Bureau of Land Management, Moab District Office

Operator: Anadarko Petroleum Corporation

Well Name & Number: Oliveto Federal SWD A-3

API Number: 43-007-30555

Lease: Federal **Surface Owner:** Federal

Location: SW NE **Sec.** 8 **T.** 14 S. **R.** 10 E.

Conditions of Approval

1. General

Compliance with the requirements of Utah Admin. R. 649-1 et seq., the Oil and Gas Conservation General Rules, and the applicable terms and provisions of the approved Application for Permit to Drill.

2. Notification Requirements

Notify the Division within 24 hours of spudding the well. Contact Carol Daniels at (801)538-5284.

Notify the Division prior to commencing operations to plug and abandon the well. Contact Dan Jarvis at (801) 538-5338 or Robert Krueger at (801) 538-5274.

3. Reporting Requirements

All required reports, forms and submittals shall be promptly filed with the Division, including but not limited to the Entity Action Form (Form 6), Report of Water Encountered During Drilling (Form 7), Weekly Progress Reports for drilling and completion operations, and Sundry Notices and Reports on Wells requesting approval of change of plans or other operational actions.

4. State approval of this well does not supersede the required federal approval which must be obtained prior to drilling.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

FORM APPROVED
Budget Bureau No. 1004-0135
Expires July 31, 1996

SUBMIT IN TRIPLICATE - Other instructions on reverse side

1. Type of Well
☐ Oil Well ☐ Gas Well ☒ Other (SWD) coalbed methane

2. Name of Operator
Anadarko Petroleum Corporation

3a. Address
17001 Northchase Dr., Houston, Texas 77060

3b. Phone No. (include area code)
(281) 874-8766

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Surface & BHL: 1201' FSL & 840' FEL of Section 8, T14S, R10E

515599E

4385253N

CONFIDENTIAL

8. Well Name and No.
Federal F-2 SWD

9. API Well No.
4300730555

10. Field and Pool, or Exploratory Area

11. County or Parish, State
Carbon County UT

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

- ☒ Notice of Intent
☒ Subsequent Report
☐ Final Abandonment Notice

TYPE OF ACTION

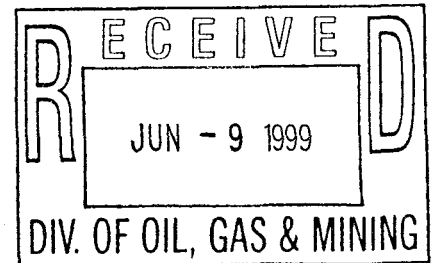
- | | | | |
|---|---|--|--|
| <input type="checkbox"/> Acidize | <input type="checkbox"/> Deepen | <input type="checkbox"/> Production (Start/Resume) | <input type="checkbox"/> Water Shut-Off |
| <input type="checkbox"/> Alter Casing | <input type="checkbox"/> Fracture Treat | <input type="checkbox"/> Reclamation | <input type="checkbox"/> Well Integrity |
| <input type="checkbox"/> Casing Repair | <input type="checkbox"/> New Construction | <input type="checkbox"/> Recomplete | <input type="checkbox"/> Other <u>change</u> |
| <input type="checkbox"/> Change Plans | <input type="checkbox"/> Plug and Abandon | <input type="checkbox"/> Temporarily Abandon | <u>location & rename</u> |
| <input type="checkbox"/> Convert to Injection | <input type="checkbox"/> Plug Back | <input type="checkbox"/> Water Disposal | <u>well</u> |

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the final site is ready for final inspection.)

Change well name from Oliveto A-3 SWD to Federal F-2 SWD and move location as per attached survey plat.
The Surface Land Use Agreement is attached.

The remainder of the original permit to drill as submitted is unchanged.

Federal Approval of this
Action is Necessary



14. I hereby certify that the foregoing is true and correct
Name (Printed/Typed)

Judy Davidson

Title

Regulatory Analyst

Date 06-08-99

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

BRADLEY G. HILL
RECLAMATION SPECIALIST III

Date

6/30/99

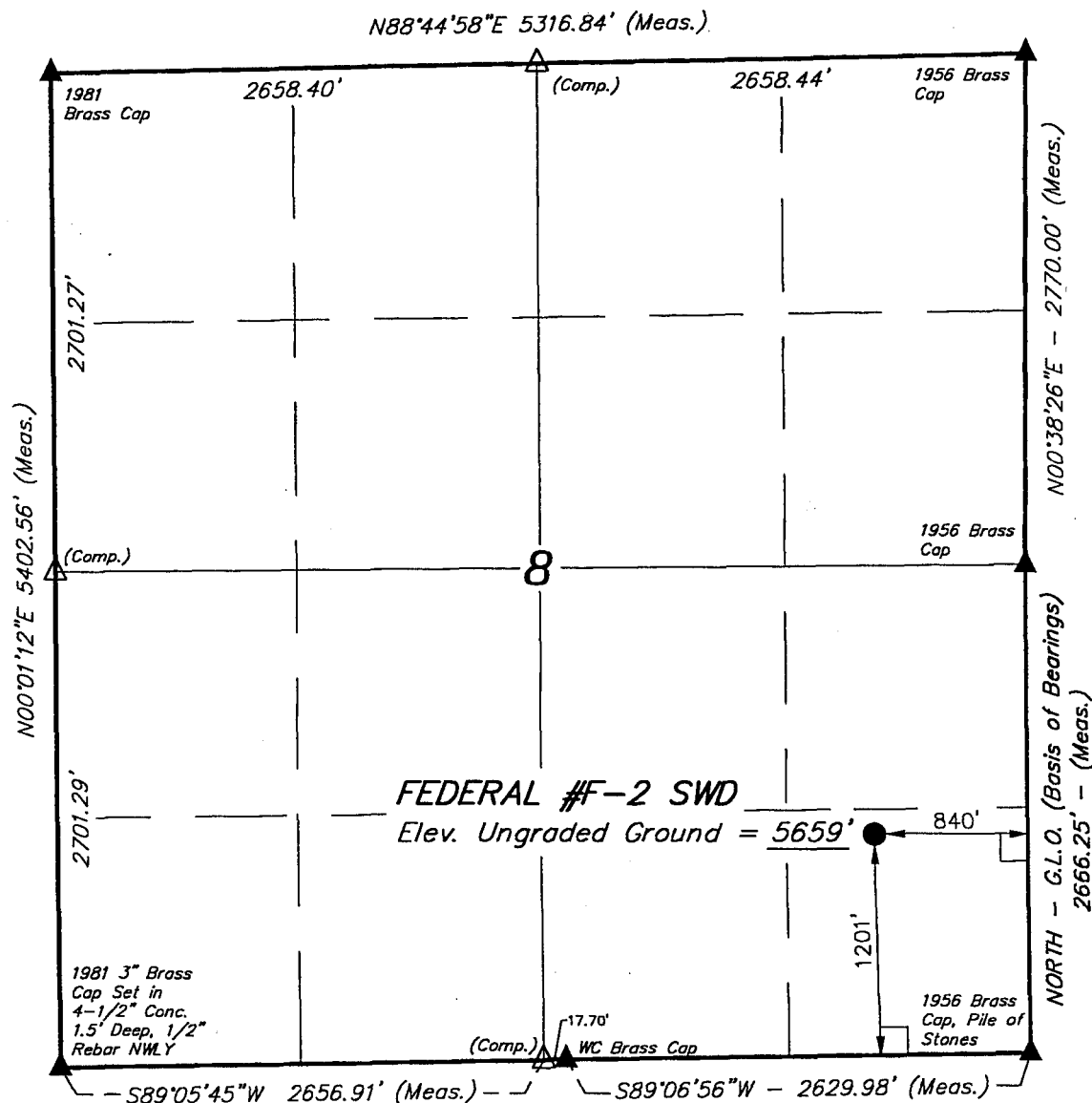
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)

T14S, R10E, S.L.B.&M.



LEGEND:

└─┘ = 90° SYMBOL

● = PROPOSED WELL HEAD.

▲ = SECTION CORNERS LOCATED.

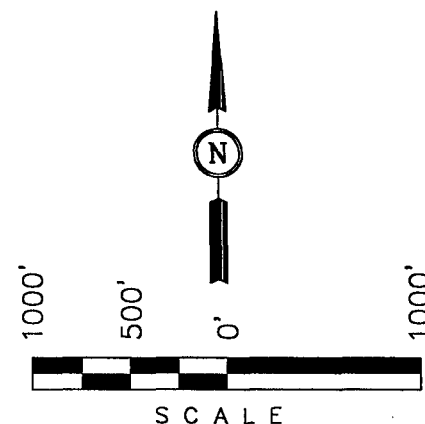
LATITUDE = 39°37'07"
LONGITUDE = 110°49'07"

ANADARKO PETROLEUM CORP.

Well location, FEDERAL #F-2 SWD, located as shown in the SE 1/4 SE 1/4 of Section 8, T14S, R10E, S.L.B.&M. Carbon County, Utah

BASIS OF ELEVATION

SPOT ELEVATION AT THE SOUTHEAST CORNER OF SECTION 8, T14S, R10E, S.L.B.&M. TAKEN FROM THE PRICE QUADRANGLE, UTAH, CARBON COUNTY, 7.5 MINUTE QUAD. (TOPOGRAPHIC MAP) PUBLISHED BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY. SAID ELEVATION IS MARKED AS BEING 5710 FEET.



CERTIFICATE

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Robert L. J. J.
REGISTERED LAND SURVEYOR
REGISTRATION NO. 161319
STATE OF UTAH

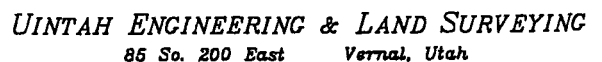
UINTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST - VERNAL, UTAH 84078
(435) 789-1017

| | | |
|----------------------------|----------------------------------|------------------------|
| SCALE 1" = 1000' | DATE SURVEYED: 5-14-99 | DATE DRAWN: 5-20-99 |
| PARTY L.D.T. S.L. D.COX | REFERENCES G.L.O. PLAT | |
| WEATHER WARM | FILE ANADARKO PETROLEUM CORP. | |

LOCATION LAYOUT FOR

SECTION 8, T14S, R10E, S.L.B.&M.

Drawn By: D.COX



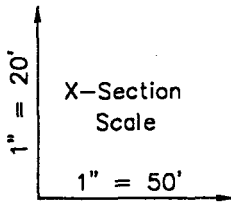
ANADARKO PETROLEUM CORP.

TYPICAL CROSS SECTIONS FOR

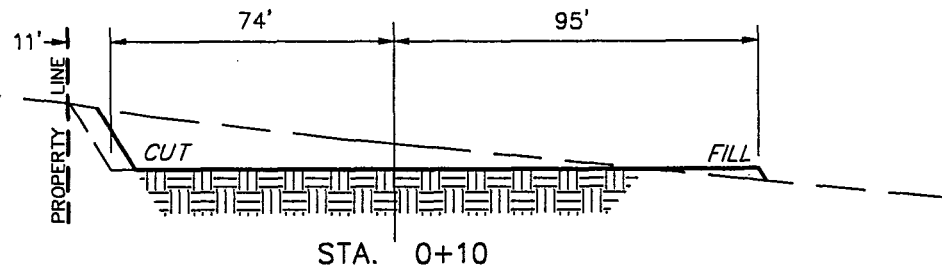
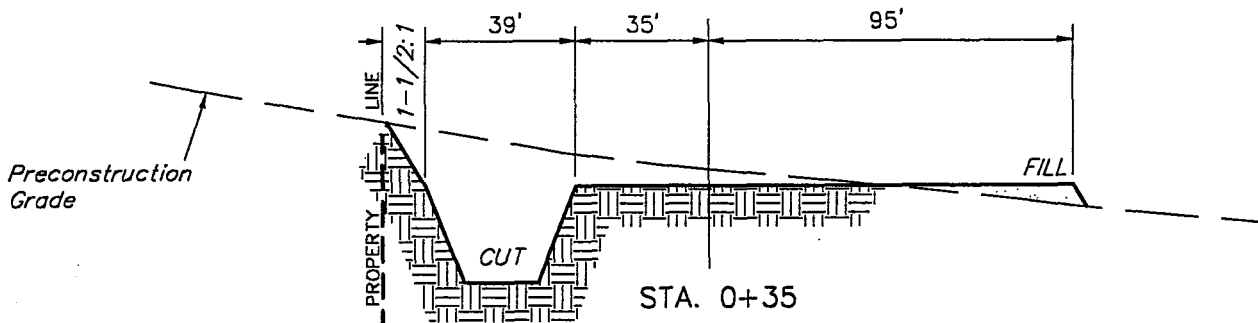
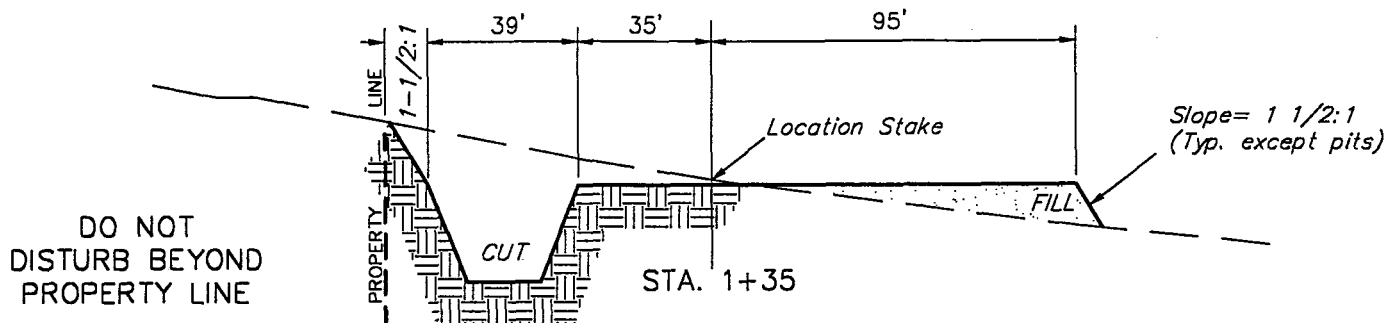
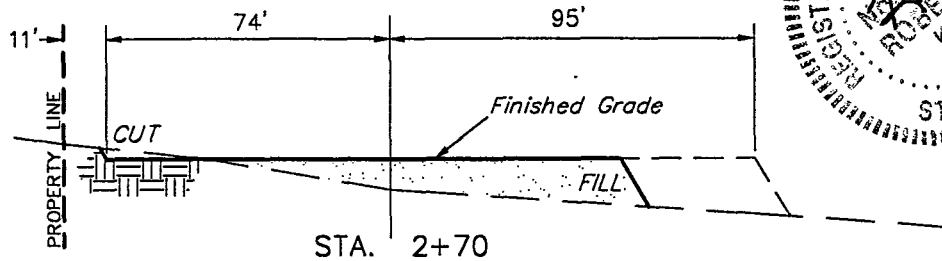
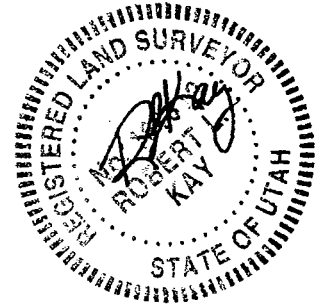
FEDERAL #F-2 SWD

SECTION 8, T14S, R10E, S.L.B.&M.

1201' FSL 840' FEL



DATE: 5-21-99
Drawn By: D.COX

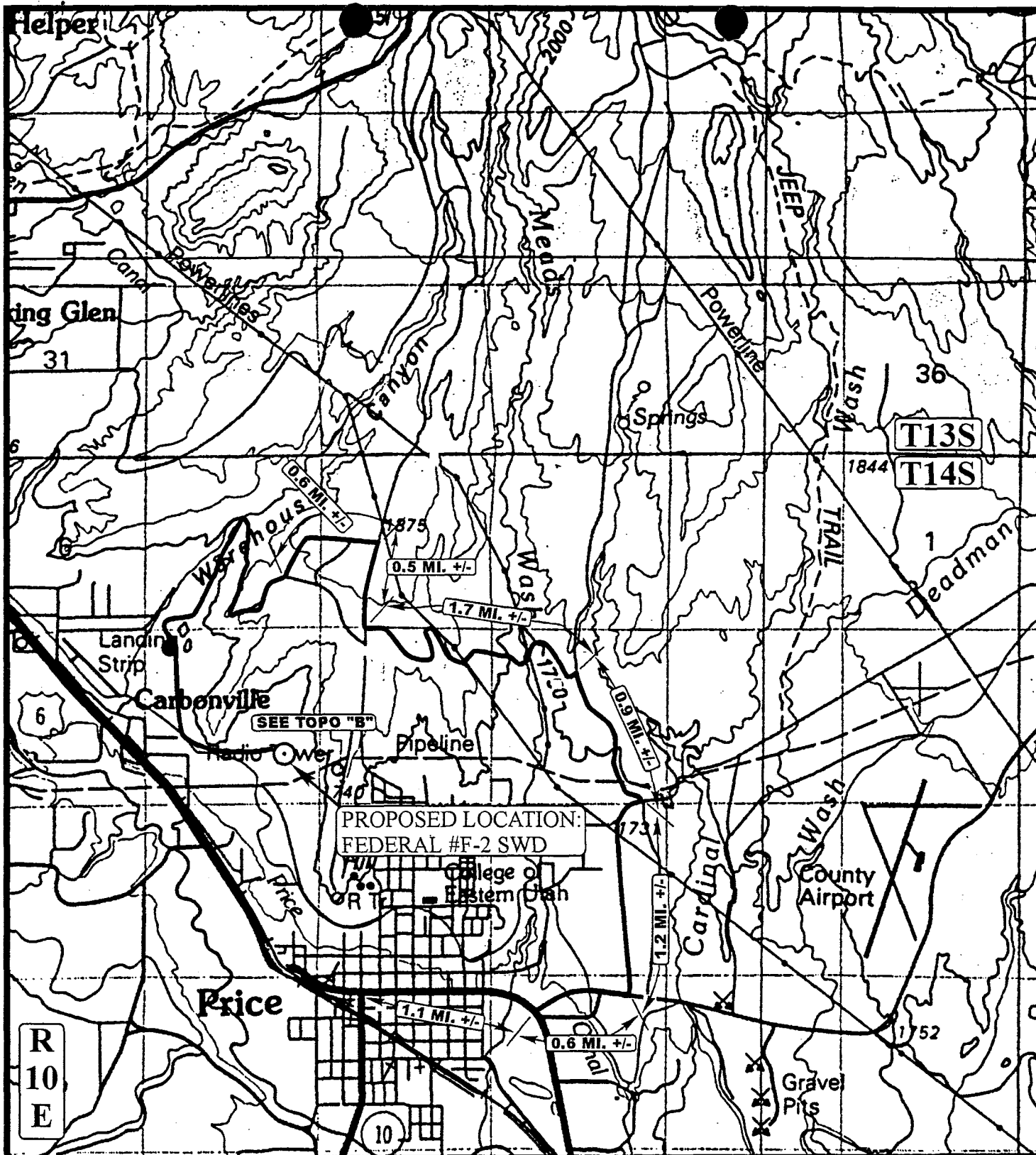


APPROXIMATE YARDAGES

| | |
|------------------------|------------------------|
| CUT | |
| (6") Topsoil Stripping | = 850 Cu. Yds. |
| Remaining Location | = 3,710 Cu. Yds. |
| TOTAL CUT | = 4,560 CU.YDS. |
| FILL | = 2,570 CU.YDS. |

| | |
|---|------------------|
| EXCESS MATERIAL AFTER 5% COMPACTION | = 1,850 Cu. Yds. |
| Topsoil & Pit Backfill (1/2 Pit Vol.) | = 1,500 Cu. Yds. |
| EXCESS UNBALANCE (After Rehabilitation) | = 350 Cu. Yds. |

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East Vernal, Utah



LEGEND:

○ PROPOSED LOCATION



Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1018

N



ANADARKO PETROLEUM CORP.

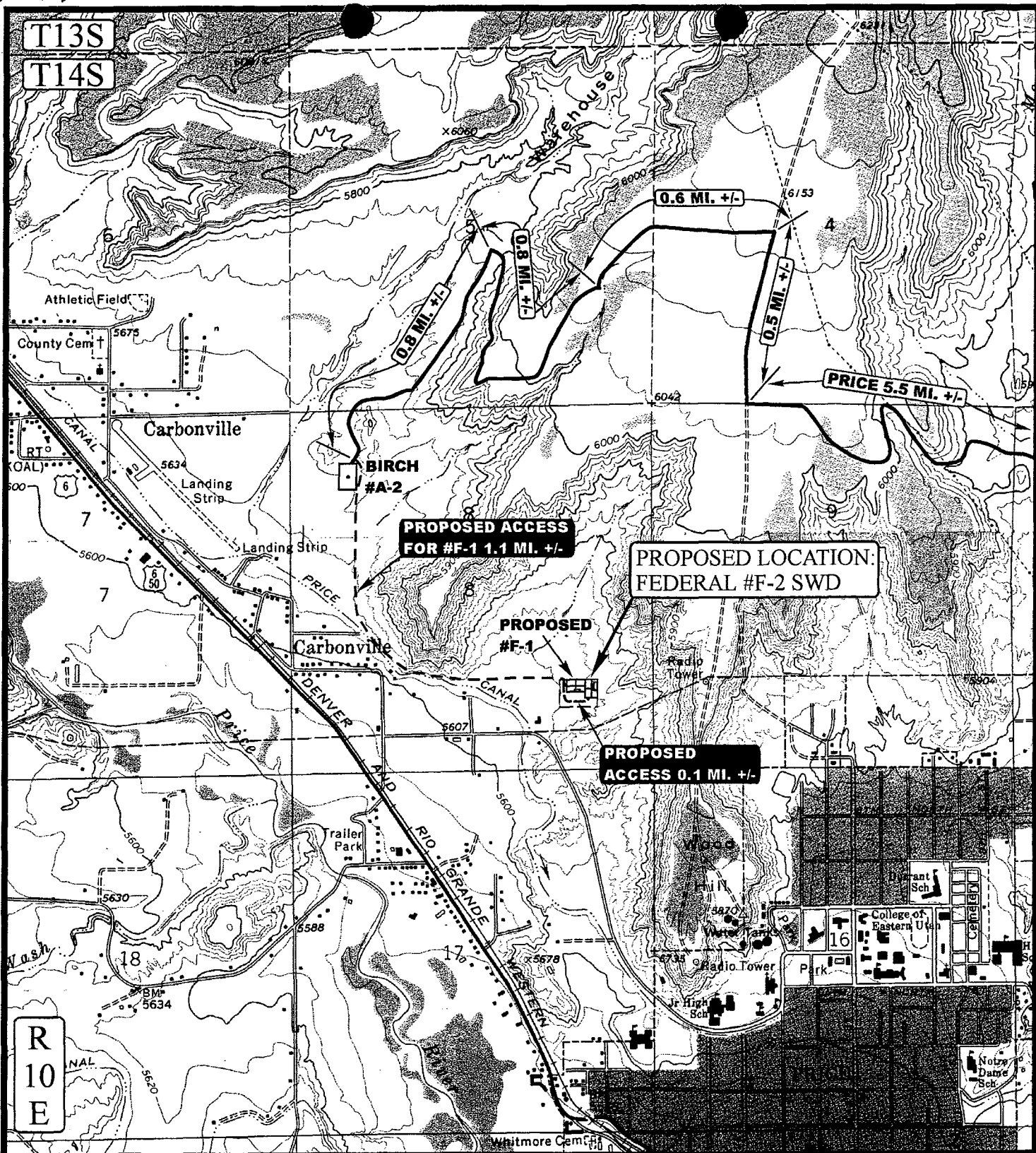
FEDERAL #F-2 SWD
SECTION 8, T14S, R10E, S.L.B.&M.
1201' FSL 840' FEL

TOPOGRAPHIC
MAP

5 20 99
MONTH DAY YEAR

SCALE: 1"=4000' DRAWN BY: J.L.G. REVISED: 00-00-00

A
TOPO



LEGEND:

--- PROPOSED ACCESS ROAD
 --- EXISTING ROAD

ANADARKO PETROLEUM CORP.

FEDERAL #F-2 SWD
 SECTION 8, T14S, R10E, 6th P.M.
 1201' FSL 840' FEL

U
E
I
S

Uintah Engineering & Land Surveying
 85 South 200 East Vernal, Utah 84078
 (435) 789-1017 * FAX (435) 789-1813



TOPOGRAPHIC
 MAP

5 20 99
 MONTH DAY YEAR

SCALE: 1" = 2000' DRAWN BY: J.L.G. REVISED: 00-00-00

B
 TOPO

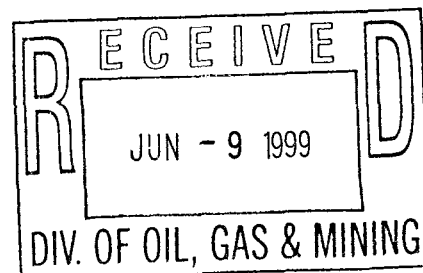
June 8, 1999



Bureau of Land Management
82 East Dogwood
Moab, Utah 84532

Attention: Marie McGann

RE: Sundry Notices
Carbon County



Gentlemen:

Enclosed, in triplicate, are Sundry Notices and Reports on Wells (Form 3160-5) requesting approval to rename and change locations for the following wells in Carbon County.

Federal F-1, Carbon County (formerly the Oliveto A-1)
Federal F-2 SWD, Carbon County (formerly the Oliveto A-3 SWD)

In addition, two copies of the Sundry Notice have been forwarded to the Price River Resources Area Field Office and two copies to the State of Utah Division of Oil, Gas & Mining.

Please call me at (281) 874-8766 if you require further information or have any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Judy Davidson".
Judy Davidson
Regulatory Analyst

JD/me
enclosures

cc: Bureau of Land Management
900 North, 700 East
Price, Utah 84501

A rectangular stamp with the text "State of Utah" at the top, "Division of Oil, Gas & Mining" in the center, and "1594 West North Temple, Suite 1210 Salt Lake City, Utah 84114-6801" at the bottom.
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-6801



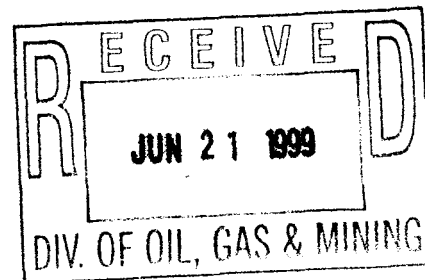
June 18, 1999

State of Utah
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-6801

Attention: Lisha Cordova

RE: Exception to Location, Rule 649-3-3
Federal F-2, SWD
Section 8, Township 14S, Range 10E
43-007-30555

Gentlemen:



In accordance with Rule 649-3-3, Exception to Location and Siting of Wells, Anadarko Petroleum Corporation hereby requests a location exception for the Federal F-2 SWD well in Carbon County, Utah. This location exception is requested due to topography in this area which mandates that this well be positioned 1021' from the south line and 840' from the east line of Section 8, Township 14S, Range 10E. Anadarko is its own offset operator and waives its objection to this exception. There are no other owners within 460' of this proposed wellsite.

Please call me at (281) 874-8766 if you require further information or have any questions.

Sincerely,

Judy Davidson
Regulatory Analyst

JD/me



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Kathleen Clarke
Executive Director

Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

June 30, 1999

AMENDED PERMIT APPROVAL

Anadarko Petroleum Corporation
17001 Northchase Drive
Houston, Texas 77060

Re: Federal F-2 SWD Well, 1201' FSL, 840' FEL, SE SE, Sec. 8, T. 14 S., R. 10 E., Carbon County, Utah

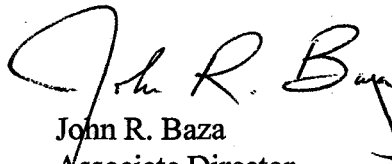
Gentlemen:

Pursuant to the provisions and requirements of Utah Code Ann. 40-6-1 et seq., Utah Administrative Code R649-3-1 et seq., and the attached Conditions of Approval, approval to drill the referenced well is granted.

Appropriate information has been submitted to DOGM by the operator and administrative approval of the requested exception location is hereby granted.

This approval shall expire one year from the above date unless substantial and continuous operation is underway, or a request for extension is made prior to the expiration date. The API identification number assigned to this well is 43-007-30555.

Sincerely,



John R. Baza
Associate Director

lwp

Enclosures

cc: Carbon County Assessor
Bureau of Land Management, Moab District Office

Operator: Anadarko Petroleum Corporation

Well Name & Number: Federal F-2 SWD

API Number: 43-007-30555

Lease: Federal **Surface Owner:** Fee

Location: SE SE **Sec.** 8 **T.** 14 S. **R.** 10 E.

Conditions of Approval

1. General

Compliance with the requirements of Utah Admin. R. 649-1 et seq., the Oil and Gas Conservation General Rules, and the applicable terms and provisions of the approved Application for Permit to Drill.

2. Notification Requirements

Notify the Division within 24 hours of spudding the well. Contact Carol Daniels at (801)538-5284.

Notify the Division prior to commencing operations to plug and abandon the well. Contact Dan Jarvis at (801) 538-5338 or Robert Krueger at (801) 538-5274.

3. Reporting Requirements

All required reports, forms and submittals shall be promptly filed with the Division, including but not limited to the Entity Action Form (Form 6), Report of Water Encountered During Drilling (Form 7), Weekly Progress Reports for drilling and completion operations, and Sundry Notices and Reports on Wells requesting approval of change of plans or other operational actions.

4. State approval of this well does not supersede the required federal approval which must be obtained prior to drilling.

5. Compliance with the Conditions of Approval/Application for Permit to Drill outlined in the Statement of Basis (copy attached).

DIVISION OF OIL, GAS AND MINING

CONFIDENTIAL

SPUDDING INFORMATION

Name of Company: ANADARKO PETROLEUM CORP

Well Name: FEDERAL F-2 SWD

Api No. 43-007-30555 Lease Type: FEDERAL

Secton 08 Township 14S Range 10E County CARBON

Drilling Contractor UNION RIG # 17

SPUDDED:

Date 07/06/99

Time 8:00 AM

How DRY HOLE

Drilling will commence _____

Reported by JIM HARTLY

Telephone # 1-435-637-3044

Date 07/06/99 Signed: CHD

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING
ENTITY ACTION FORM - FORM 6

OPERATOR ANADARKO Petroleum Corp. OPERATOR ACCT. NO. N 0035
ADDRESS 17001 Northchase Drive
Houston, Texas 77060

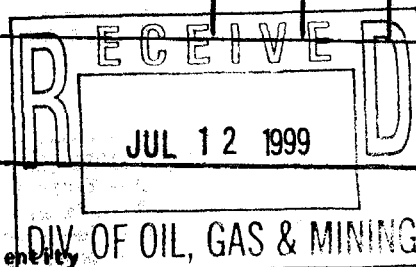
| ACTION CODE | CURRENT ENTITY NO. | NEW ENTITY NO. | API NUMBER | WELL NAME | WELL LOCATION | | | | | SPUD DATE | EFFECTIVE DATE |
|--|--------------------|----------------|--------------|--------------|---------------|----|-----|-----|--------|-----------|----------------|
| | | | | | QQ | SC | TP | RG | COUNTY | | |
| A | 99999 | 12557 | 48-007-30555 | Federal F. 2 | SESE | 8 | 145 | 10E | Carbon | 7-6-99 | |
| WELL 1 COMMENTS: 9910716 entity added. KDR | | | | | | | | | | | |
| CONFIDENTIAL | | | | | | | | | | | |
| WELL 2 COMMENTS: | | | | | | | | | | | |
| WELL 3 COMMENTS: | | | | | | | | | | | |
| WELL 4 COMMENTS: | | | | | | | | | | | |
| WELL 5 COMMENTS: | | | | | | | | | | | |

ACTION CODES (See instructions on back of form)

- A - Establish new entity for new well (single well only)
- B - Add new well to existing entity (group or unit well)
- C - Re-assign well from one existing entity to another existing entity
- D - Re-assign well from one existing entity to a new entity
- E - Other (explain in comments section)

NOTE: Use COMMENT section to explain why each Action Code was selected.

(3/89)



Signature

Field Foreman

Title

Date

Phone No. (435) 637-3044

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0137
Expires: November 30, 2000

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

| | | | | | | | | | | |
|---|-------------------|-----------------------------|-------------------|--|----------------------|---|-------------------|---|-------------------|--|
| 1a. Type of Well <input type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Other SALT WATER DISPOSAL | | | | | | | | | | 5. Lease Serial No. UTU-65762 |
| b. Type of Completion: <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Work Over <input type="checkbox"/> Deepen <input type="checkbox"/> Plug Back <input type="checkbox"/> Diff. Resvr., Other _____ | | | | | | | | | | 6. If Indian, Allottee or Tribe Name |
| 2. Name of Operator Anadarko Petroleum Corp. | | | | | | | | | | 7. Unit or CA Agreement Name and No. |
| 3. Address 17001 Northchase Dr., Houston, Texas 77060 | | | | | | 3a. Phone No. (include area code) 281-875-1101 | | 8. Lease Name and Well No. Federal F-2 SWD | | |
| 4. Location of Well (Report location clearly and in accordance with Federal requirements)* At surface 1201' FSL & 840' FEL of Section 8, T14S, R10E At top prod. interval reported below Same At total depth Same | | | | | | | | | | 9. API Well No. 4300730555 |
| 14. Date Spudded 7/6/99 | | | | | | | | | | 10. Field and Pool, or Exploratory |
| 15. Date T.D. Reached 7/26/99 | | | | | | | | | | 11. Sec., T., R., M., or Block and Survey of Area Sec. 8, T14S, R10E |
| 16. Date Completed 7-26-99 <input type="checkbox"/> D & A <input type="checkbox"/> Ready to Prod. | | | | | | | | | | 12. County or Parish Carbon |
| 17. Elevations (DF, RKB, RT, GL)* 5674' KB 5659' GL | | | | | | | | | | 13. State Utah |
| 18. Total Depth: MD TVD 6200' | | | | 19. Plug Back T.D.: MD TVD 6165' | | | | 20. Depth Bridge Plug Set: MD TVD NONE | | |
| 21. Type Electric & Other Mechanical Logs Run (Submit copy of each) CBL\GR\CALP\DRHO\DP\SMP | | | | | | | | | | 22. Was well cored? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Submit analysis) Was DST run <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Submit report) Directional Survey? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Submit) |
| 23. Casing and Liner Record (Report all strings set in well) | | | | | | | | | | |
| Hole Size | Size/Grade | Wt. (#ft.) | Top (MD) | Bottom (MD) | Stage Cementer Depth | No. of Sks. & Type of Cement | Slurry Vol. (BBL) | Cement Top* | Amount Pulled | |
| 13 3/8" | K-55 | 48# | 0 | 317' | | 340 SXS | | SURFACE | NONE | |
| 8 5/8" | K-55 | 24# | 0 | 2285' | | 1000 SXS | | SURFACE | NONE | |
| 5 1/2" | K-55 | 17# | 0 | 6200' | | 620 SXS | | 2100' | NONE | |
| 24. Tubing Record | | | | | | | | | | |
| Size | Depth Set (MD) | Packer Depth (MD) | Size | Depth Set (MD) | Packer Depth (MD) | Size | Depth Set (MD) | Packer Depth (MD) | | |
| 2 7/8" | 5600' | 5600' | | | | | | | | |
| 25. Producing Intervals | | | | | | | | | | |
| Formation | | Top | Bottom | Perforated Interval | | Size | No. Holes | Perf. Status | | |
| A) NAVAJO | | 5649' | 6155' | 5649' - 6155' | | .42 EHD | 1,476 | OPEN | | |
| B) | | | | | | | | | | |
| C) | | | | | | | | | | |
| D) | | | | | | | | | | |
| 26. Perforation Record | | | | | | | | | | |
| 27. Acid, Fracture, Treatment, Cement Squeeze, Etc. | | | | | | | | | | |
| Depth Interval | | Amount and Type of Material | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 28. Production - Interval A | | | | | | | | | | |
| Date First Produced | Test Date | Hours Tested | Test Production → | Oil BBL | Gas MCF | Water BBL | Oil Gravity | Gas Gravity | Production Method | |
| Choke Size | Tbg. Press. Flwg. | Csg. Press. | 24 Hr. → | Oil BBL | Gas MCF | Water BBL | Gas: Oil Ratio | Well Status | | |
| 28a. Production-Interval B | | | | | | | | | | |
| Date First Produced | Test Date | Hours Tested | Test Production → | Oil BBL | Gas MCF | Water BBL | Oil Gravity | Gas Gravity | Production Method | |
| Choke Size | Tbg. Press. Flwg. | Csg. Press. | 24 Hr. → | Oil BBL | Gas MCF | Water BBL | Gas: Oil Ratio | Well Status | | |

28b. Production - Interval C

| Date First Produced | Test Date | Hours Tested | Test Production → | Oil BBL | Gas MCF | Water BBL | Oil Gravity | Gas Gravity | Production Method |
|---------------------|-------------------|--------------|-------------------|---------|---------|-----------|----------------|-------------|-------------------|
| Choke Size | Tbg. Press. Flwg. | Csg. Press. | 24 Hr. → | Oil BBL | Gas MCF | Water BBL | Gas: Oil Ratio | Well Status | |

28c. Production-Interval D

| Date First Produced | Test Date | Hours Tested | Test Production → | Oil BBL | Gas MCF | Water BBL | Oil Gravity | Gas Gravity | Production Method |
|---------------------|-------------------|--------------|-------------------|---------|---------|-----------|----------------|-------------|-------------------|
| Choke Size | Tbg. Press. Flwg. | Csg. Press. | 24 Hr. → | Oil BBL | Gas MCF | Water BBL | Gas: Oil Ratio | Well Status | |

29. Disposition of Gas (Sold, used for fuel, vented, etc.)

30. Summary of Porous Zones (Include Aquifers):

Show all important zones of porosity and contents thereof: Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries

31. Formation (Log) Markers

| Formation | Top | Bottom | Descriptions, Contents, etc. | Name | Top |
|--------------|------|--------|------------------------------|-------------------|-------------|
| | | | | | Meas. Depth |
| L. CARMEL L. | 5406 | 5634 | | Lower Carmel Lime | 5406 |
| NAVAJO | 5634 | 6001 | | Navajo | 5634 |
| KAYENTA | 6001 | 6066 | | Kayenta | 6001 |
| WINGATE | 6066 | 6200 | | Wingate | 6066 |

32. Additional remarks (include plugging procedure):

33. Circle enclosed attachments:

1. Electrical/Mechanical Logs (1 full set req'd) 2. Geologic Report 3. DST Report 4. Directional Survey
5. Sundry Notice for plugging and cement verification 6. Core Analysis 7. Other

34. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions)*

Name (please print) SHAD FRAZIERTitle PRODUCTION ENGINEERSignature Date 3/8/00

Federal F-2 SWD

1201' FSL & 840' FEL Sec 8-T14S-R10E

Carbon County, Utah

SPUD RIG OFF

SURFACE 07/06/1999 07/26/1999

PRODUCTION 11/05/1997

5659 GL KB

WELL WORK HISTORY

08/03/1999 Bond Log Run TOC at 2100'. Bottom of 8 5/8 at 2285.

17 1/2" Hole
13 3/8" 48#
Set w/ 340 sxs cmt
Circ 32 bbls of cmt

317

12 1/4" Hole
8 5/8" 24# K-55
1000 sxs cmt
Circ 70 bbls of cmt

2285

DV Tool

5020

SURFACE STRING

NOTES: Guide shoe and no floats used

13-3/8" 48# - set @ 317
CEMENT: Type: Class G @ 15.6 ppg
Volume: 340 sx

Cement Top: Circ 32 bbls cmt to surf

INTERMEDIATE STRING

FC@ 12620

NOTES: Bumped plug, floats did not hold

8-5/8" 24# J55 STC - set @ 2285 FS@ 2285 State DOGM witnessed
Hole Size: 12.25 TD: 12714

CEMENT: Type: Hal-Lite @ 12.7 ppg & Class G @ 15.6 ppg
Volume: 750 lead / 250 tail

Cement Top: Circ 70 bbl cement

INJECTION STRING

FC@ 6155

NOTES: Full returns during cement job

5-1/2" 15.5# K55 LTC - set @ 6200 FS@ 6200 Added gilsonite for LC & CCM w/ LCM
Hole Size: 7.875" TD: 6200 DV Tool @ 5020'

CEMENT: Type: Hal-Lite @ 12.7 ppg & 50/50 Poz @ 14.4 ppg
Volume: 1st 200 sx / 2nd 420 sx

Calc. TOC: 1800' est.

(Holes) Perforations

(244) 5649 - 5710
(400) 5720 - 5820
(448) 5838 - 5950
(160) 5958 - 5998
(176) 6072 - 6116
(48) 6143 - 6155

(1,476) Total Holes

DEVIATION ANGLE

500 4
2121 4 13/20
2466 4 1/4
3254 5
4151 4 3/4
5021 5 1/2
5855 2 1/4

6165'

FORMATION TOP KB 5674

Lower Carmel Lime 5406 268
Navajo 5634 40
Kayenta 6001 -327
Wingate 6066 -392

Gross interval 369'

Hole Size 7 7/8"
5 1/2" 15.5# K-55
620 sxs cmt

TD 6200

LAST REVISED: 03/07/2000



March 8, 2000

Bureau of Land Management
82 East Dogwood
Moab, Utah 84532
Attn: Ms. Marie McGann

Re: Form 3160-4
Well Completion Report and Log
Federal F-2 Salt Water Disposal Well

Dear Ms. McGann:

Please find enclosed, a Form 3160-4, (in duplicate) Well Completion Report and Logs for the above mentioned well. *(Log in log file)*

Should you require any additional information, please contact me at (281) 873-3899.

Best regards,

ANADARKO PETROLEUM CORPORATION

April A. Leger
April A. Leger
Sr. Technical Assistant

Cc: Bureau of Land Management
Price River Resources Area
125 South, 600 West
Price, Utah 84501

Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

RECEIV

MAR 3 2000

DIVISION OF
OIL, GAS AND MINING

RECEIVED

MAR 13 2000

DIVISION OF
OIL, GAS AND MINING

RECORDED

ADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.

CONFIDENTIAL

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

07/07/1999 MIRU - SET 20" CONDUCTOR @ 13', GROUT SAME, SPUD @ 0800 HRS 06 JULY 1999, DRLG F/ 13-320 W/ HAMMER BIT, POOH, RIH W/ 7 JTS 13-3/8" 48# CSG, SET CSG @ 317, CMT W/ 340 SX @ 15.6 PPG, CIRC 32 BBLS CMT, LAST SURVEY @ N/A, MW 8.6 PPG, CC 65,000. RPT #1

07/08/1999 WOC, CUT CSG, NU BOPE, TEST SAME, RIH, D/O CMT 277-320, AIR DRLG F/ 320-442, LAST SURVEY @ 400-0.5°, CC 86,890. RPT #2

07/09/1999 AIR DRLG F/ 442-1477, LAST SURVEY MISS RUN, CC 96,397. RPT #3

07/10/1999 AIR DRLG F/ 1477-2271, CCH @ 2154 & 2185, LAST SURV MISS RUN, CC 107,617. RPT #4

07/11/1999 AIR DRLG F/ 2271-2285, CC F/ LOGS, SHORT TRIP, POOH, RIH W/ LOGS - LOGS STOPPED @ 2080, R/D LOGGERS, MIX MUD, RIH W/ MULTISHOT, DISP W/ MUD, W&R F/ 2075-2180, LAST SURV @ 2121-4.65°, CC 122,003. RPT #5

07/12/1999 W&R F/ 2180-2285, CCM, SHORT TRIP, POOH, RIH W/ LOGS, LOG WELL, R/D LOGGERS, RIH, CCM, POOH, RIH W/ 8-5/8" 24# CSG, LAST SURV @ 2121-4.65°, CC 133,780. RPT #6

07/13/1999 RIH W/ 51 JTS 8-5/8" 24# CSG, WASH 10' TO BTM, SET CSG @ 2285, CCM, CMT W/ 755 SX LEAD @ 12.7 PPG & 250 SX TAIL @ 15.6 PPG, DISP, CIRC 70 BBL CMT TO SURF, BUMP PLUG, FLOATS DID NOT HOLD, SI & HELD PRESS 4 HRS, CUT CSG, INSTALL B SECTION, NU BOP, TEST BOP, RIH, LAST SURV @ 2121-4.65°, CC 184,487. RPT #7

07/14/1999 RIH, D/O CMT & FS, DRILL 10', FIT 10 PPG EMW, DRLG F/ 2295-2497, C&C TIGHT HOLE @ 2497, DRLG F/ 2497-2964, LAST SURV @ 2466-4.25°, CC 194,411. RPT #8

07/15/1999 DRLG F/ 2964-3334, TFB 3 @ 3334 - TIGHT HOLE, LAST SURV @ 3254-5.0°, CC 204,958. RPT #9

07/16/1999 TIH W/ BIT 3, W&R 2570-2664 & 2839-3210 & 3300-BTM, DRLG F/ 3334-3597, LAST SURVEY @ 3254-5.0°, CC 221,832. RPT #10

07/17/1999 DRLG F/ 3597-3954, LAST SURV @ 3570-5.25°, MW 9.0 PPG, CC 233,761. RPT #11

07/18/1999 DRLG F/ 3954-4226, TFB 5 @ 4226, LAST SURV @ 4151-4.75°, MW 9.1 PPG, CC 249,303. RPT #12

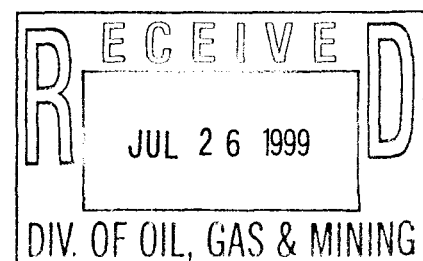
07/19/1999 DRLG F/ 4226-4422, TRIP F/ MTR @ 4408, LAST SURV @ 4333-5.0°, MW 9.1 PPG, CC 258,609. RPT #13

07/20/1999 DRLG F/ 4422-4800, LAST SURV @ 4333-5.0°, MW 9.0 PPG, CC 269,570. RPT #14

07/21/1999 DRLG F/ 4800,-5096, TFB 6 @ 5096, LAST SURV @ 5021-5.5°, MW 9.0 PPG, CC 279,982. RPT #15

07/22/1999 DRLG F/ 5096-5473, LAST SURV @ 5021-5.5°, MW 9.1 PPG, CC 295,041. RPT #16

07/23/1999 DRLG F/ 5473-5922, TFB 7 @ 5922, LAST SURV @ 5021-5.5°, MW 9.1 PPG, CC 306,854. RPT #17



ANADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.

CONFIDENTIAL

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

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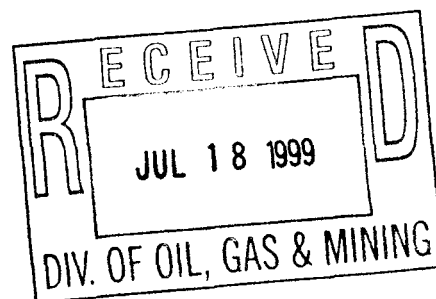
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ADARKO PETROLEUM CORPORATION
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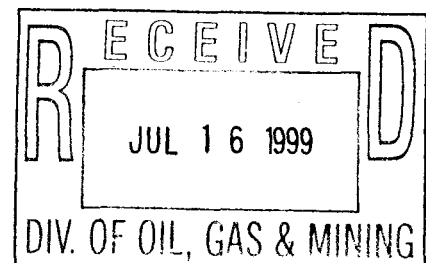
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CONFIDENTIAL



ADARKO PETROLEUM CORPORATION

WELL HISTORY
ONSHORE - U.S.

43-007-30555

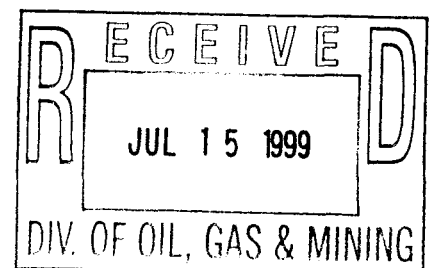
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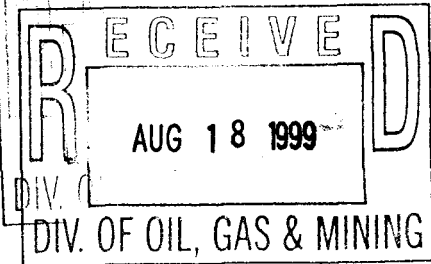
CONFIDENTIAL



STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

APPLICATION FOR INJECTION WELL - UIC FORM 1

OPERATOR Anadarko Petroleum Corporation
ADDRESS 17001 Northchase Drive
Houston, TX 77060



| | |
|---------------------------------|-------------------------------|
| Well name and | |
| Field or Unit | |
| Well location | |
| Is this appli | |
| Will the prop | |
| Is this appli | |
| If this appli | |
| has a casing | |
| Date of tes | |
| API number | |
| Proposed inje | |
| Proposed maxi | |
| *Maximum inje | |
| Proposed inje | |
| mile of the w | |
| IMPOR | |
| List of Attac | |
| Information | |
| I certify tha | |
| Name <u>Shad Frazier</u> | Signature <u>Shad Frazier</u> |
| Title <u>Engineer</u> | Date <u>8/16/99</u> |
| Phone No. <u>(281) 873-1227</u> | |
| (State use only) | |
| Application approved by _____ | Title _____ |
| Approval Date _____ | |

Have Shad Frazier submit support arguments for a max injection pressure (1400* requested) in excess of fracture pressure (~300*) in Fed F-L. To do this he should do what RGC has had to do - argue that the sealing layer is the Carmel anhydrites and the fracture pressure would stay within the greater fracture pressure of that interval.

UIC-243.1
se nc 6/99 well name fr.
count Olive Fed. SWD A-3
Yes op. River Gas "Lboms" fr. SWNE
Yes ☐ No ☒
Yes ☒ No ☐
Yes ☐ No ☒
Yes ☐ No ☒
Yes ☒ No ☐

0000 psig
ash water within %

9-5-2 should

Diagram, Fracture

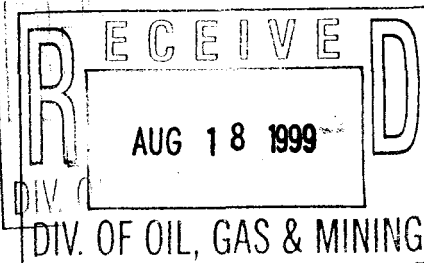
f my knowledge.

Comments:

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

APPLICATION FOR INJECTION WELL - UIC FORM 1

OPERATOR Anadarko Petroleum Corporation
ADDRESS 17001 Northchase Drive
Houston, TX 77060



Well name and number: Helper Federal F-2 SWD

Field or Unit name: Helper Field Lease no. _____

Well location: QQ ^{SESE}~~SW SW~~ section 8 township 14S range 10E county Carbon

Is this application for expansion of an existing project? . . Yes ☐ No ☒

Will the proposed well be used for: Enhanced Recovery? . . Yes ☐ No ☒
Disposal? Yes ☒ No ☐
Storage? Yes ☐ No ☒

Is this application for a new well to be drilled? Yes ☐ No ☒

If this application is for an existing well,
has a casing test been performed on the well? Yes ☒ No ☐

Date of test: 08/04/99

API number: 43-007-30555

Proposed injection interval: from 5649 to 6155

Proposed maximum injection: rate * pressure 1400 ~~1300~~ () psig

*Maximum injection rate to be limited by maximum pressure

Proposed injection zone contains ☐ oil, ☐ gas, and/or ☒ fresh water within 1/2 mile of the well.

IMPORTANT: Additional information as required by R6 49-5-2 should accompany this form.

List of Attachments: Location Plat, Ownership Plat, Wellbore Diagram, Fracture Information, Logs, Water Analysis

I certify that this report is true and complete to the best of my knowledge.

Name Shad Frazier

Title Engineer

Phone No. (281) 873-1227

Signature Shad Frazier

Date 8/16/99

(State use only)

Application approved by _____ Title _____

Approval Date _____

Comments:



August 17, 1999

Mr. John Baza
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1220
Salt Lake City, UT 84114

**Reference: Helper Federal F-2 SWD
 Section 8-T14S-R10E
 Carbon County, Utah**

Dear Mr. Baza:

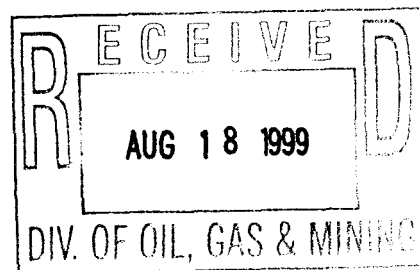
Attached for your approval is a request for a Class II Injection Permit for the Helper Federal F-2 SWD in Carbon County, Utah. This well was spud on July 6th, 1999 and completed on August 5th, 1999. Please find enclosed all the required information according to Utah requirements for Class Injection Wells.

Anadarko appreciates your timely attention to this matter. Should you require any additional information, please contact Shad Frazier at (281) 873-1227.

Sincerely,

Shad Frazier
Engineer

SF
Attachment



HELPER STATE SWD #1 PERMIT APPLICATION

Anadarko Petroleum Corporation requests a salt water disposal injection permit for the Helper Federal SWD F-2 located in Section 8-T14S-R10E, Carbon County, Utah. Pursuant to the Permitting Requirements for Class II Injection Wells, enclosed is UIC Form 1 with the appropriate accompanying documents and attachments.

The UIC Form 1 and wellbore diagram are in Section 1 of the attachments. The acreage and well location plat shows Anadarko's acreage in yellow and is also included in Section 1. Anadarko is the only operator in the outlined area and owns the surface acreage.

A casing integrity test will be performed on this well when the injection tubing and packer are installed. The field personnel will contact DOGM one week in advance to ask for onsite surveillance of this test. Copies of the test data will be submitted to the state one week after the test is performed.

Copies of the porosity, electrical and cement bond logs are enclosed as required under Section 2.2-2.3.

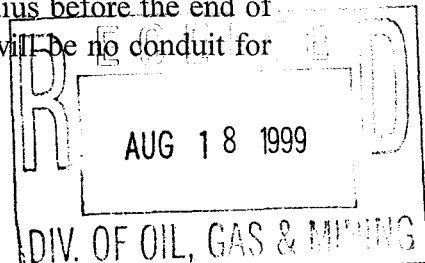
A completed wellbore diagram is attached that depicts the casing program. The setting depths for all the float equipment are listed on the diagram.

Based on analyses of both the Ferron Coal produced water and the water of the Navajo formation, no compatibility problems will be caused by mixing of the two waters. In fact, injection of the Ferron Coal produced water reduces the total dissolved solids content and scaling tendency of the Navajo water. Section 2 contains all the data to back this statement.

Injection tests have been performed on the Navajo formation and the data is included in Section 3. The step rate analysis shows that we had not even begun to see any formation parting pressure at 6 BPM and 1250 psig. No higher rates were tested due to previous experiences with this interval. The measured surface treating pressure was mostly due to friction inside the tubing. This means that at 1250 psig we had not gone past the matrix's ability to absorb the injected fluid. Because we did not overcome the formation's ability to accept fluids without cracking at 1250 psig, Anadarko Petroleum requests the injection limit for the Federal F-2 SWD be set at 1300 psig.

Please reference the attached 3rd party hydrological and geological study used in the permit application for the Helper State SWD #1 for all questions regarding Section 2.10 of rule R649-5-20. The confining beds are the Lower Carmel Lime at 5406 and the Carmel Anhydrite at 5222'. These beds provide total containment of all injected fluids from mixing with any above zones.

No wells are currently drilled within one half-mile radius of the referenced well. No other operators are currently or have been active in the half-mile radius surrounding this well. Anadarko Petroleum is planning on drilling a well within this half-mile radius before the end of this year. The well will not be completed below 2400'. Therefore, there will be no conduit for fluids to migrate up or down this wellbore and enter improper intervals.



Contents

Section 1

- UIC Form 1
- Wellbore diagram
- Acreage and ownership plat

Section 2

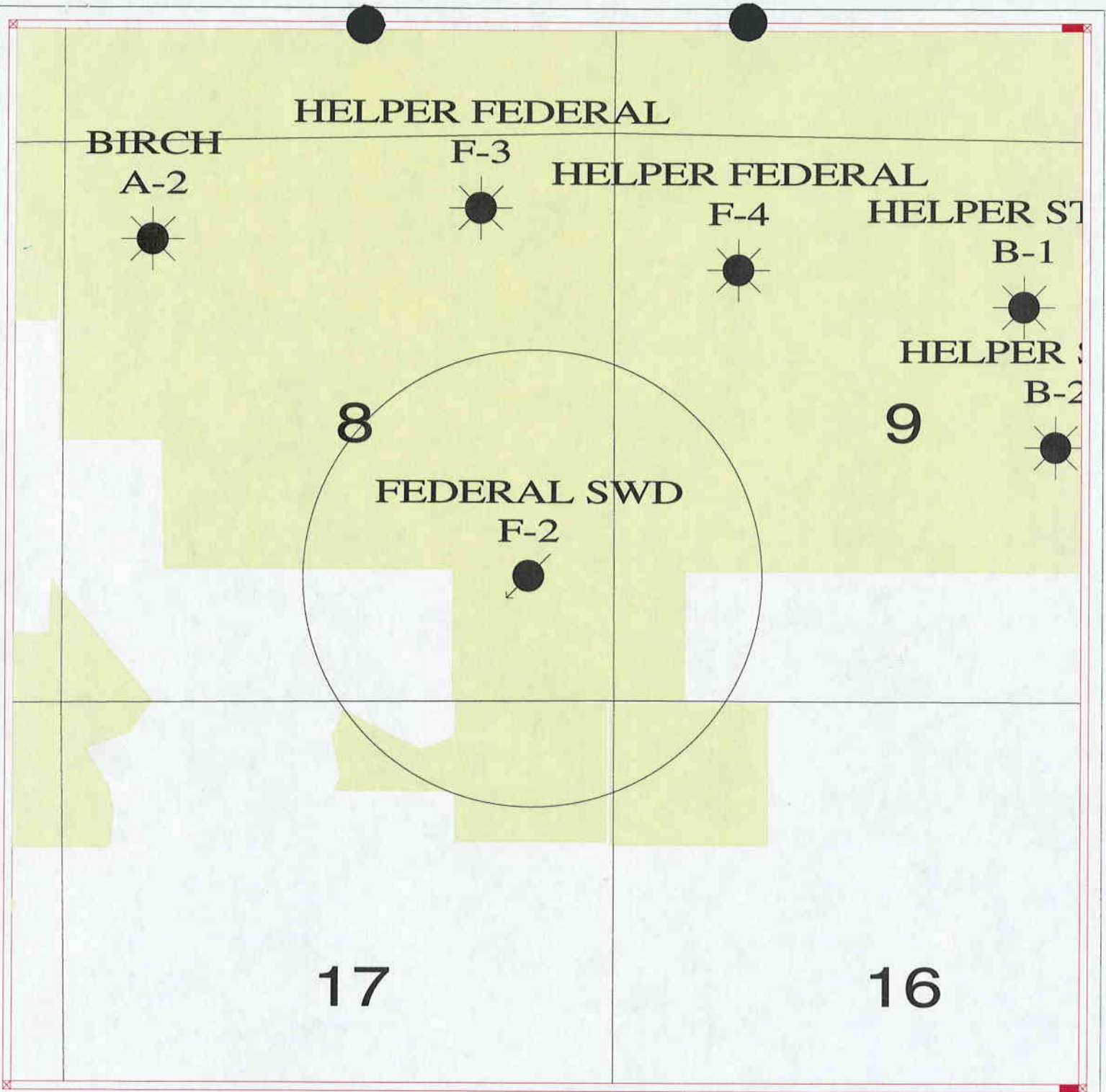
- Water analysis of combined disposal waters
- Water analysis of upper Navajo
- Water analysis of lower Navajo
- Water analysis of Wingate

Section 3

- Step rate test graph
- Step rate test data

Section 4

- 3rd party geological and hydrological investigation from the Helper State SWD #1 submitted December 1, 1997 about the Navajo formation.



APC—100%

LEGEND

- ★ Gas Well
- Water Injector

Anadarko Petroleum Corporation

Helper SWD Permit
Surface Ownership
Well in Area

Keith Buck

8-12-99

Scale 1:15903.66

Federal F-2 SWD

1201' FSL & 840' FEL Sec 8-T14S-R10E

Carbon County, Utah

SPUD RIG OFF

SURFACE 07/06/99 07/26/99

PRODUCTION 11/05/97

5659 GL KB

WELL WORK HISTORY

17 1/2" Hole
13 3/8" 48#
Set w/ 340 sxs cmt
Circ 32 bbls of cmt

12 1/4" Hole
8 5/8" 24# K-55
1000 sxs cmt
Circ 70 bbls of cmt

DV Tool

(Holes) Perforations

(244) 5649 - 5710
(400) 5720 - 5820
(448) 5838 - 5950
(160) 5958 - 5998
(176) 6072 - 6116
(48) 6143 - 6155

(1,476) Total Holes

Hole Size 7 7/8"
5 1/2" 15.5# K-55
620 sxs cmt

TD 6200

08/03/99 Bond Log Run TOC at 2100'. Bottom of 8 5/8 at 2285.

SURFACE STRING

NOTES: Guide shoe and no floats used

13-3/8" 48# - set @ 317
CEMENT: Type: Class G @ 15.6 ppg
Volume: 340 sx

Cement Top: Circ 32 bbls cmt to surf

INTERMEDIATE STRING

FC@ 12620 NOTES: Bumped plug, floats did not hold

8-5/8" 24# J55 STC - set @ 2285 FS@ 2285 State DOGM witnessed
Hole Size: 12.25 TD: 12714

CEMENT: Type: Hal-Lite @ 12.7 ppg & Class G @ 15.6 ppg
Volume: 750 lead / 250 tail

Cement Top: Circ 70 bbl cement

INJECTION STRING

FC@ 6155 NOTES: Full returns during cement job

5-1/2" 15.5# K55 LTC - set @ 6200 FS@ 6200 Added gilsonite for LC & CCM w/ LCM
Hole Size: 7.875" TD: 6200 DV Tool @ 5020'

CEMENT: Type: Hal-Lite @ 12.7 ppg & 50/50 Poz @ 14.4 ppg
Volume: 1st 200 sx / 2nd 420 sx

Calc. TOC: 1800' est.

DEVIATION ANGLE

| | |
|------|---------|
| 500 | 4 |
| 2121 | 4 13/20 |
| 2466 | 4 1/4 |
| 3254 | 5 |
| 4151 | 4 3/4 |
| 5021 | 5 1/2 |
| 5855 | 2 1/4 |

FORMATION

TOP KB

5674

| | | |
|-------------------|------|------|
| Lower Carmel Lime | 5406 | 268 |
| Navajo | 5634 | 40 |
| Kayenta | 6001 | -327 |
| Wingate | 6066 | -392 |

Gross interval 369'

LAST REVISED: 08/11/99



NALCO/EXXON
ENERGY CHEMICALS, L.P.

VISCO Water Compatibility Report
Copyright 1991-1995, Nalco Chemical Company

8/11/99

Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.
CLIENT LOCATION: HELPER FIELD

FEDERAL F 2 AND CPF WATER
COMMINGLED WATER

So what is CPF
water?

PRODUCED WATER (FED. F2 UPPER PERFS)

Sample Date : 8/9/99

Water Source: Produced

FRESH WATER (CPF)

Sample date : 8/9/99

Water Source: Fresh

| Temperature Degrees F | Water Mixture Fresh/Produced | CaCO3 Index Stiff/Davis | CaSO4 Index Skillman | Actual CaSO4 Mg/L |
|--------------------------|---------------------------------|----------------------------|-------------------------|----------------------|
| 60 | 0/100 | 0.80 | -10.44 | 4216 |
| | 20/80 | 0.73 | -18.74 | 3509 |
| | 40/60 | 0.65 | -26.47 | 2802 |
| | 50/50 | 0.60 | -30.09 | 2448 |
| | 60/40 | 0.55 | -33.53 | 2095 |
| | 80/20 | 0.43 | -39.78 | 1387 |
| | 100/0 | 0.23 | -45.01 | 673 |
| 80 | 0/100 | 0.99 | -10.72 | |
| | 20/80 | 0.92 | -19.01 | |
| | 40/60 | 0.84 | -26.74 | |
| | 50/50 | 0.80 | -30.36 | |
| | 60/40 | 0.75 | -33.81 | |
| | 80/20 | 0.63 | -40.08 | |
| | 100/0 | 0.42 | -45.35 | |
| 100 | 0/100 | 1.23 | -10.87 | |
| | 20/80 | 1.16 | -19.19 | |
| | 40/60 | 1.08 | -26.93 | |
| | 50/50 | 1.04 | -30.57 | |
| | 60/40 | 0.99 | -34.03 | |
| | 80/20 | 0.87 | -40.34 | |
| | 100/0 | 0.66 | -45.65 | |
| 120 | 0/100 | 1.52 | -10.65 | |
| | 20/80 | 1.45 | -19.07 | |
| | 40/60 | 1.37 | -26.91 | |
| | 50/50 | 1.32 | -30.58 | |
| | 60/40 | 1.27 | -34.08 | |
| | 80/20 | 1.14 | -40.46 | |
| | 100/0 | 0.93 | -45.81 | |
| 140 | 0/100 | 1.84 | -9.63 | |
| | 20/80 | 1.78 | -18.05 | |

NALCO/EXXON
ENERGY CHEMICALS, L.P.

| | | | |
|-----|-------|------|--------|
| | 40/60 | 1.70 | -25.91 |
| | 50/50 | 1.65 | -29.60 |
| | 60/40 | 1.60 | -33.11 |
| | 80/20 | 1.46 | -39.51 |
| | 100/0 | 1.24 | -44.90 |
| 160 | 0/100 | 2.22 | -8.50 |
| | 20/80 | 2.15 | -16.92 |
| | 40/60 | 2.07 | -24.79 |
| | 50/50 | 2.02 | -28.49 |
| | 60/40 | 1.97 | -32.01 |
| | 80/20 | 1.82 | -38.43 |
| | 100/0 | 1.58 | -43.85 |
| 180 | 0/100 | 2.63 | -7.35 |
| | 20/80 | 2.57 | -15.78 |
| | 40/60 | 2.49 | -23.65 |
| | 50/50 | 2.44 | -27.36 |
| | 60/40 | 2.38 | -30.89 |
| | 80/20 | 2.23 | -37.34 |
| | 100/0 | 1.95 | -42.78 |



NALCO/EXXON
ENERGY CHEMICALS, L.P.

VISCO Water Compatibility Report
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8/11/99
Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.
CLIENT LOCATION: HELPER FIELD

FEDERAL F 2 AND CPF WATER
COMMINGLED WATER

PRODUCED WATER

Sample Date : 8/9/99

Water Source: Produced (FED. F2 MIDDLE PERFS)

FRESH WATER

Sample date : 8/9/99

Water Source: Fresh (CPF)

| Temperature Degrees F | Water Mixture Fresh/Produced | CaCO3 Index Stiff/Davis | CaSO4 Index Skillman | Actual CaSO4 Mg/L |
|--------------------------|---------------------------------|----------------------------|-------------------------|----------------------|
|--------------------------|---------------------------------|----------------------------|-------------------------|----------------------|

| | | | | |
|----|-------|------|--------|------|
| 60 | 0/100 | 0.71 | -42.65 | 3754 |
| | 20/80 | 0.63 | -46.69 | 3138 |
| | 40/60 | 0.54 | -49.36 | 2522 |
| | 50/50 | 0.50 | -50.11 | 2213 |
| | 60/40 | 0.45 | -50.40 | 1905 |
| | 80/20 | 0.33 | -49.29 | 1289 |
| | 100/0 | 0.23 | -45.01 | 673 |

| | | | | |
|----|-------|------|--------|--|
| 80 | 0/100 | 0.91 | -43.02 | |
| | 20/80 | 0.82 | -47.02 | |
| | 40/60 | 0.74 | -49.66 | |
| | 50/50 | 0.69 | -50.39 | |
| | 60/40 | 0.64 | -50.67 | |
| | 80/20 | 0.53 | -49.57 | |
| | 100/0 | 0.42 | -45.35 | |

| | | | | |
|-----|-------|------|--------|--|
| 100 | 0/100 | 1.15 | -43.10 | |
| | 20/80 | 1.06 | -47.13 | |
| | 40/60 | 0.98 | -49.80 | |
| | 50/50 | 0.93 | -50.55 | |
| | 60/40 | 0.88 | -50.84 | |
| | 80/20 | 0.77 | -49.79 | |
| | 100/0 | 0.66 | -45.65 | |

| | | | | |
|-----|-------|------|--------|--|
| 120 | 0/100 | 1.44 | -42.36 | |
| | 20/80 | 1.35 | -46.58 | |
| | 40/60 | 1.26 | -49.46 | |
| | 50/50 | 1.22 | -50.32 | |
| | 60/40 | 1.17 | -50.71 | |
| | 80/20 | 1.05 | -49.84 | |
| | 100/0 | 0.93 | -45.81 | |

| | | | | |
|-----|-------|------|--------|--|
| 140 | 0/100 | 1.76 | -41.36 | |
| | 20/80 | 1.67 | -45.55 | |

NALCO/EXXON
ENERGY CHEMICALS, L.P.

| | | | |
|-----|-------|------|--------|
| | 40/60 | 1.59 | -48.42 |
| | 50/50 | 1.54 | -49.28 |
| | 60/40 | 1.50 | -49.69 |
| | 80/20 | 1.38 | -48.87 |
| | 100/0 | 1.24 | -44.90 |
| 160 | 0/100 | 2.13 | -40.33 |
| | 20/80 | 2.04 | -44.45 |
| | 40/60 | 1.96 | -47.29 |
| | 50/50 | 1.92 | -48.14 |
| | 60/40 | 1.87 | -48.56 |
| | 80/20 | 1.75 | -47.76 |
| | 100/0 | 1.58 | -43.85 |
| 180 | 0/100 | 2.54 | -39.29 |
| | 20/80 | 2.44 | -43.34 |
| | 40/60 | 2.37 | -46.13 |
| | 50/50 | 2.33 | -46.98 |
| | 60/40 | 2.29 | -47.40 |
| | 80/20 | 2.16 | -46.64 |
| | 100/0 | 1.95 | -42.78 |



NALCO/EXXON
ENERGY CHEMICALS, L.P.

VISCO Water Compatibility Report
Copyright 1991-1995, Nalco Chemical Company

8/9/99

Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.
CLIENT LOCATION: HELPER FIELD

FEDERAL F 2 AND CPF WATER
COMMINGLED WATER

PRODUCED WATER (FED. F2 LOWER PERFS)

Sample Date : 8/9/99

Water Source: Produced

FRESH WATER (CPF)

Sample date : 8/9/99

Water Source: Fresh

| Temperature Degrees F | Water Mixture Fresh/Produced | CaCO3 Index Stiff/Davis | CaSO4 Index Skillman | Actual CaSO4 Mg/L |
|--------------------------|---------------------------------|----------------------------|-------------------------|----------------------|
| 60 | 0/100 | 0.47 | -27.68 | 3672 |
| | 20/80 | 0.39 | -36.04 | 3074 |
| | 40/60 | 0.34 | -42.59 | 2475 |
| | 50/50 | 0.32 | -45.06 | 2176 |
| | 60/40 | 0.30 | -46.92 | 1877 |
| | 80/20 | 0.24 | -48.28 | 1278 |
| | 100/0 | 0.23 | -45.01 | 673 |
| 80 | 0/100 | 0.67 | -28.06 | |
| | 20/80 | 0.59 | -36.40 | |
| | 40/60 | 0.53 | -42.91 | |
| | 50/50 | 0.51 | -45.37 | |
| | 60/40 | 0.49 | -47.20 | |
| | 80/20 | 0.43 | -48.55 | |
| | 100/0 | 0.42 | -45.35 | |
| 100 | 0/100 | 0.91 | -28.10 | |
| | 20/80 | 0.83 | -36.48 | |
| | 40/60 | 0.77 | -43.03 | |
| | 50/50 | 0.75 | -45.50 | |
| | 60/40 | 0.73 | -47.35 | |
| | 80/20 | 0.67 | -48.76 | |
| | 100/0 | 0.66 | -45.65 | |
| 120 | 0/100 | 1.19 | -27.13 | |
| | 20/80 | 1.11 | -35.71 | |
| | 40/60 | 1.06 | -42.50 | |
| | 50/50 | 1.04 | -45.11 | |
| | 60/40 | 1.01 | -47.09 | |
| | 80/20 | 0.96 | -48.76 | |
| | 100/0 | 0.93 | -45.81 | |
| 140 | 0/100 | 1.52 | -26.29 | |
| | 20/80 | 1.44 | -34.75 | |

NALCO/EXXON
ENERGY CHEMICALS, L.P.

| | | |
|-------|------|--------|
| 40/60 | 1.38 | -41.48 |
| 50/50 | 1.36 | -44.07 |
| 60/40 | 1.34 | -46.06 |
| 80/20 | 1.29 | -47.77 |
| 100/0 | 1.24 | -44.90 |

| | | | |
|-----|-------|------|--------|
| 160 | 0/100 | 1.90 | -25.46 |
| | 20/80 | 1.81 | -33.76 |
| | 40/60 | 1.75 | -40.39 |
| | 50/50 | 1.73 | -42.95 |
| | 60/40 | 1.71 | -44.93 |
| | 80/20 | 1.66 | -46.65 |
| | 100/0 | 1.58 | -43.85 |

| | | | |
|-----|-------|------|--------|
| 180 | 0/100 | 2.32 | -24.62 |
| | 20/80 | 2.22 | -32.77 |
| | 40/60 | 2.16 | -39.29 |
| | 50/50 | 2.14 | -41.82 |
| | 60/40 | 2.13 | -43.78 |
| | 80/20 | 2.08 | -45.52 |
| | 100/0 | 1.95 | -42.78 |



NALCO/EXXON
ENERGY CHEMICALS, L.P.

Downhole Water Analysis

8/11/99

Copyright 1991-1995, Nalco Chemical Company

Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.

CLIENT LOCATION: HELPER FIELD

Well Number : CPF WATER INJECTION

Water Source : COMMINGLED WATER FROM ALL OF THE WELLS IN THE FIELD

DISSOLVED SOLIDS

| Cations | mg/l | meq/l | mg/l |
|----------------|--------|-------|----------------|
| Sodium Na+ | 5510.0 | 239.6 | as NaCL 0.0 |
| Calcium Ca++ | 80.1 | 4.0 | as CaCO3 200.0 |
| Magnesium Mg++ | 35.2 | 2.9 | as CaCO3 145.0 |
| Barium Ba++ | 0.0 | 0.0 | as CaCO3 0.0 |
| Strontium Sr++ | 26.2 | 0.6 | as CaCO3 55.0 |

Total Cations 5651.6 247.1

| Anions | mg/l | mcq/l | mg/l |
|----------------|--------|-------|-----------------|
| Chloride Cl- | 6187.6 | 174.5 | as NaCL 10200.0 |
| Sulfate SO4= | 321.2 | 6.7 | as Na2SO4 475.0 |
| Carbonate CO3= | 0.0 | 0.0 | as CaCO3 0.0 |
| Bicarb. HCO3- | 4015.5 | 65.8 | as CaCO3 3294.0 |

Total Anions 10524.3 247.1

Total Solids 16175.9

METALS

Total Iron, Fe 25.5 as Fe 25.5
Acid to Phen, CO2 0.4 as CaCO3 1.0

OTHER PROPERTIES

pH 8.2
Specific Gravity 1.0
Turbidity jtu 16.0
Oxygen, as O2 ppm 0.0
Sulfide as H2S ppm 4.0
Temperature F 100.0

NALCO/EXXON
ENERGY CHEMICALS, L.P.

>>> Scaling Indices <<<

| Temperature (Deg. F) | Calcium Carbonate | Calcium Sulfate | Barium Sulfate | Strontium Sulfate |
|-------------------------|----------------------|--------------------|-------------------|----------------------|
| 60.0 | 1.53 | -34.94 | NA | NA |
| 80.0 | 1.73 | -35.51 | NA | NA |
| 100.0 | 1.95 | -35.96 | NA | -1.06 |
| 120.0 | 2.18 | -36.09 | NA | -0.85 |
| 140.0 | 2.44 | -35.71 | NA | -0.66 |
| 160.0 | 2.71 | -34.08 | NA | -0.49 |
| 180.0 | 3.00 | -32.97 | NA | -0.33 |
| 200.0 | 3.31 | NA | NA | -0.20 |
| 220.0 | NA | NA | NA | -0.07 |
| 240.0 | NA | NA | NA | 0.03 |
| 260.0 | NA | NA | NA | 0.13 |
| 280.0 | NA | NA | NA | 0.21 |
| 300.0 | NA | NA | NA | 0.28 |
| 320.0 | NA | NA | NA | NA |

Positive values indicate scaling tendencies



NALCO/EXXON
ENERGY CHEMICALS, L.P.

Downhole Water Analysis

8/11/99

Copyright 1991-1995, Nalco Chemical Company

Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.

CLIENT LOCATION: HELPER FIELD

Well Number : FEDERAL F2

Water Source : UPPER PERFS 5649' TO 5820'

Upper Navajo ss.

DISSOLVED SOLIDS

| Cations | mg/l | meq/l | mg/l |
|----------------|---------|-------|-----------------|
| Sodium Na+ | 12993.7 | 564.9 | as NaCL 0.0 |
| Calcium Ca++ | 496.6 | 24.8 | as CaCO3 1240.0 |
| Magnesium Mg++ | 96.9 | 8.0 | as CaCO3 399.0 |
| Barium Ba++ | 0.0 | 0.0 | as CaCO3 0.0 |
| Strontium Sr++ | 0.0 | 0.0 | as CaCO3 0.0 |

Total Cations 13587.1 597.7

| Anions | mg/l | meq/l | mg/l |
|----------------|---------|-------|------------------|
| Chloride Cl- | 16439.5 | 463.7 | as NaCL 27100.0 |
| Sulfate SO4= | 2569.5 | 53.5 | as Na2SO4 3800.0 |
| Carbonate CO3= | 0.0 | 0.0 | as CaCO3 0.0 |
| Bicarb. HCO3- | 4907.9 | 80.5 | as CaCO3 4026.0 |

Total Anions 23917.0 597.7

Total Solids 37504.1

METALS

| | | | |
|-------------------|------|----------|------|
| Total Iron, Fe | 22.5 | as Fe | 22.5 |
| Acid to Phen, CO2 | 0.4 | as CaCO3 | 1.0 |

OTHER PROPERTIES

| | |
|--------------------|-------|
| pH | 7.0 |
| Specific Gravity | 1.0 |
| Turbidity jtu | 17.0 |
| Oxygen, as O2 ppm | 0.0 |
| Sulfide as H2S ppm | 0.0 |
| Temperature F | 100.0 |

NALCO/EXXON
ENERGY CHEMICALS, L.P.

>>> Scaling Indices <<<

| Temperature (Deg. F) | Calcium Carbonate | Calcium Sulfate | Barium Sulfate | Strontium Sulfate |
|-------------------------|----------------------|--------------------|-------------------|----------------------|
| 60.0 | 0.74 | -20.38 | NA | NA |
| 80.0 | 0.94 | -20.71 | NA | NA |
| 100.0 | 1.17 | -21.00 | NA | NA |
| 120.0 | 1.45 | -21.15 | NA | NA |
| 140.0 | 1.76 | -20.59 | NA | NA |
| 160.0 | 2.10 | -19.16 | NA | NA |
| 180.0 | 2.49 | -18.08 | NA | NA |
| 200.0 | 2.91 | NA | NA | NA |
| 220.0 | NA | NA | NA | NA |
| 240.0 | NA | NA | NA | NA |
| 260.0 | NA | NA | NA | NA |
| 280.0 | NA | NA | NA | NA |
| 300.0 | NA | NA | NA | NA |
| 320.0 | NA | NA | NA | NA |

Positive values indicate scaling tendencies



NALCO/EXXON
ENERGY CHEMICALS, L.P.

Downhole Water Analysis

8/11/99

Copyright 1991-1995, Nalco Chemical Company

Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.

CLIENT LOCATION: HELPER FIELD

Well Number : FEDERAL F 2

Water Source : MIDDLE PERFS 5838' TO 5998'

L. Navajo SS.

DISSOLVED SOLIDS

| Cations | mg/l | meq/l | mg/l |
|----------------|---------|--------|-----------------|
| Sodium Na+ | 23037.8 | 1001.6 | as NaCL 0.0 |
| Calcium Ca++ | 448.5 | 22.4 | as CaCO3 1120.0 |
| Magnesium Mg++ | 97.1 | 8.0 | as CaCO3 400.0 |
| Barium Ba++ | 0.0 | 0.0 | as CaCO3 0.0 |
| Strontium Sr++ | 0.0 | 0.0 | as CaCO3 0.0 |

Total Cations 23583.5 1032.0

| Anions | mg/l | meq/l | mg/l |
|----------------|---------|-------|------------------|
| Chloride Cl- | 32757.8 | 924.0 | as NaCL 54000.0 |
| Sulfate SO4= | 1791.9 | 37.3 | as Na2SO4 2650.0 |
| Carbonate CO3= | 0.0 | 0.0 | as CaCO3 0.0 |
| Bicarb. HCO3- | 4313.0 | 70.7 | as CaCO3 3538.0 |

Total Anions 38862.7 1032.0

Total Solids 62446.2

METALS

Total Iron, Fe 28.1 as Fe 28.1
Acid to Phen, CO2 0.4 as CaCO3 1.0

OTHER PROPERTIES

pH 7.1
Specific Gravity 1.0
Turbidity jtu 17.0
Oxygen, as O2 ppm 0.0
Sulfide as H2S ppm 0.0
Temperature F 100.0

NALCO/EXXON
ENERGY CHEMICALS, L.P.

>>> Scaling Indices <<<

| Temperature (Deg. F) | Calcium Carbonate | Calcium Sulfate | Barium Sulfate | Strontium Sulfate |
|-------------------------|----------------------|--------------------|-------------------|----------------------|
| 60.0 | 0.58 | -40.48 | NA | NA |
| 80.0 | 0.78 | -40.76 | NA | NA |
| 100.0 | 1.02 | -40.98 | NA | NA |
| 120.0 | 1.30 | -41.02 | NA | NA |
| 140.0 | 1.63 | -40.33 | NA | NA |
| 160.0 | 2.00 | -38.89 | NA | NA |
| 180.0 | 2.42 | -37.74 | NA | NA |
| 200.0 | 2.88 | NA | NA | NA |
| 220.0 | NA | NA | NA | NA |
| 240.0 | NA | NA | NA | NA |
| 260.0 | NA | NA | NA | NA |
| 280.0 | NA | NA | NA | NA |
| 300.0 | NA | NA | NA | NA |
| 320.0 | NA | NA | NA | NA |

Positive values indicate scaling tendencies



NALCO/EXXON
ENERGY CHEMICALS, L.P.

Downhole Water Analysis

8/11/99

Copyright 1991-1995, Nalco Chemical Company

Creg Wilkins

CLIENT NAME : ANADARKO PETROLEUM INC.

CLIENT LOCATION: HELPER FIELD

Well Number : FEDERAL F 2

Water Source : LOWER PERFS 6072' TO 6155'

DISSOLVED SOLIDS

| Cations | mg/l | meq/l | mg/l |
|----------------|---------|--------|-----------------|
| Sodium Na+ | 28756.1 | 1250.3 | as NaCL 0.0 |
| Calcium Ca++ | 432.5 | 21.6 | as CaCO3 1080.0 |
| Magnesium Mg++ | 94.0 | 7.7 | as CaCO3 387.0 |
| Barium Ba++ | 0.0 | 0.0 | as CaCO3 0.0 |
| Strontium Sr++ | 0.0 | 0.0 | as CaCO3 0.0 |

Total Cations 29282.5 1279.6

| Anions | mg/l | meq/l | mg/l |
|----------------|---------|--------|------------------|
| Chloride Cl- | 41250.5 | 1163.5 | as NaCL 68000.0 |
| Sulfate SO4= | 3347.2 | 69.7 | as Na2SO4 4950.0 |
| Carbonate CO3= | 0.0 | 0.0 | as CaCO3 0.0 |
| Bicarb. HCO3- | 2825.8 | 46.3 | as CaCO3 2318.0 |

Total Anions 47423.4 1279.6

Total Solids 76706.0

METALS

| | | | |
|-------------------|-----|----------|-----|
| Total Iron, Fe | 0.9 | as Fe | 0.9 |
| Acid to Phen, CO2 | 0.4 | as CaCO3 | 1.0 |

OTHER PROPERTIES

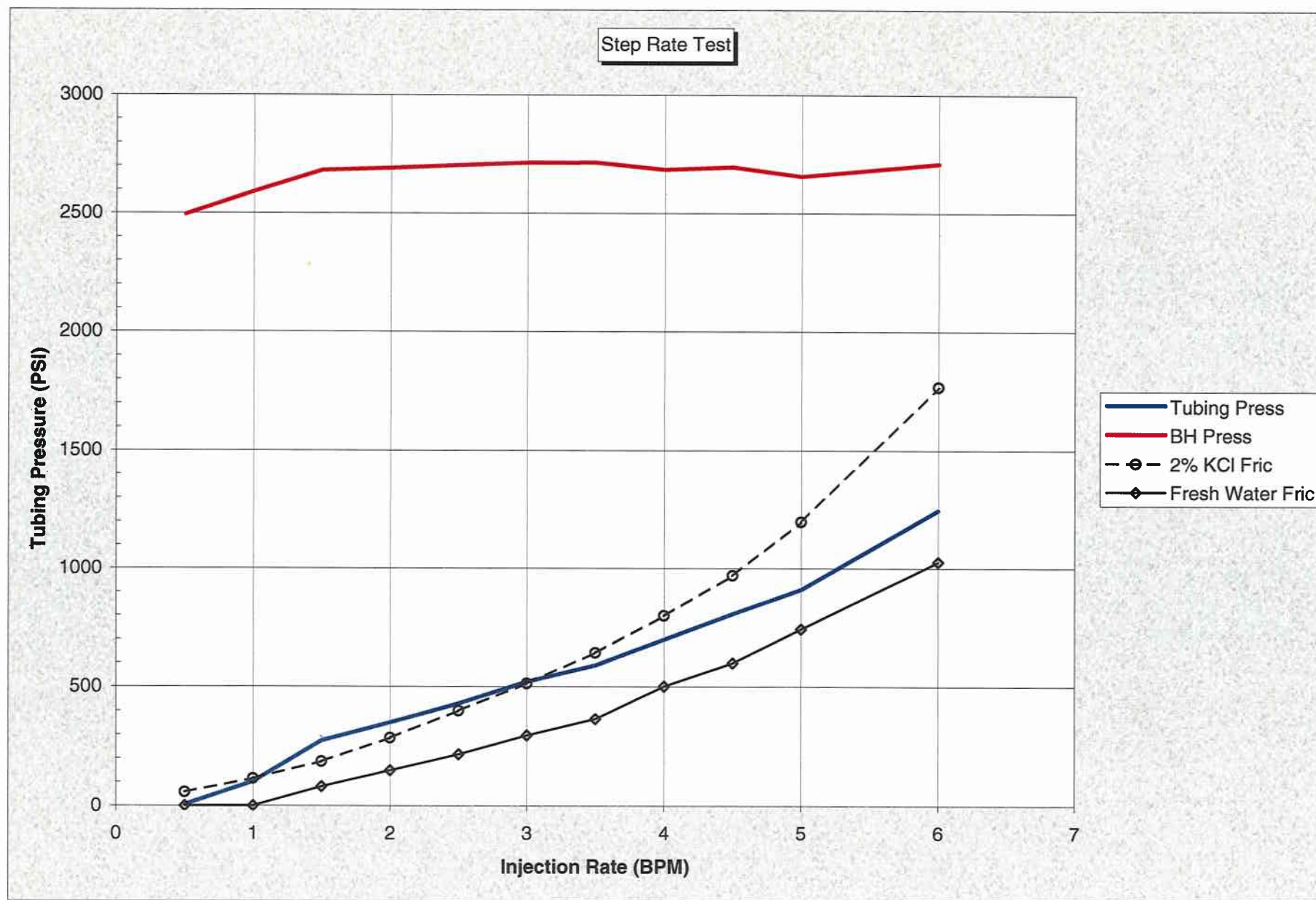
| | |
|--------------------|-------|
| pH | 7.0 |
| Specific Gravity | 1.0 |
| Turbidity jtu | 17.0 |
| Oxygen, as O2 ppm | 0.0 |
| Sulfide as H2S ppm | 0.0 |
| Temperature F | 100.0 |

NALCO/EXXON
ENERGY CHEMICALS, L.P.

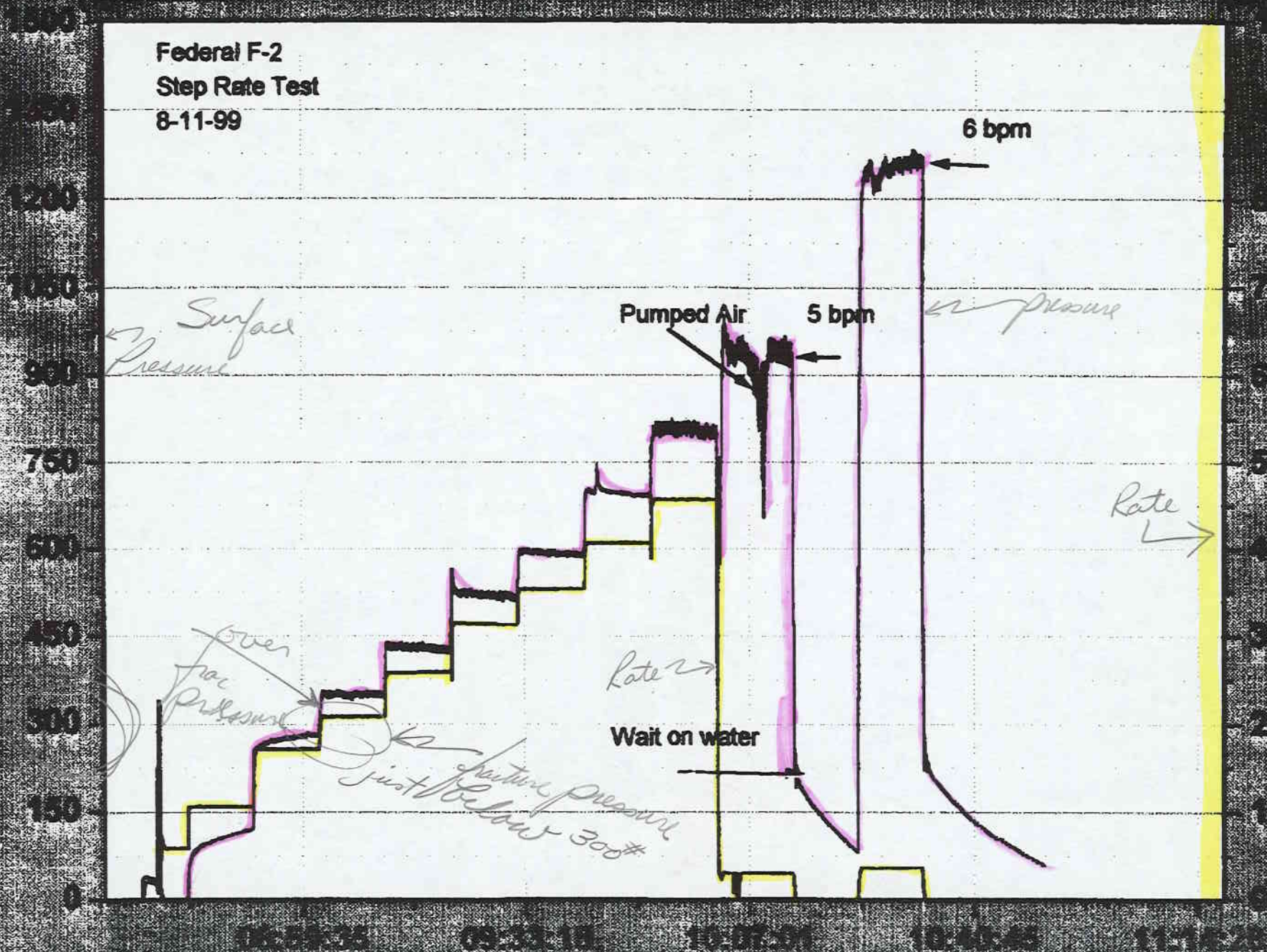
>>> Scaling Indices <<<

| Temperature (Deg F) | Calcium Carbonate | Calcium Sulfate | Barium Sulfate | Strontium Sulfate |
|------------------------|----------------------|--------------------|-------------------|----------------------|
| 60.0 | 0.24 | -33.70 | NA | NA |
| 80.0 | 0.43 | -33.96 | NA | NA |
| 100.0 | 0.67 | -34.14 | NA | NA |
| 120.0 | 0.96 | -34.06 | NA | NA |
| 140.0 | 1.29 | -33.35 | NA | NA |
| 160.0 | 1.66 | -31.99 | NA | NA |
| 180.0 | 2.08 | -30.88 | NA | NA |
| 200.0 | 2.54 | NA | NA | NA |
| 220.0 | NA | NA | NA | NA |
| 240.0 | NA | NA | NA | NA |
| 260.0 | NA | NA | NA | NA |
| 280.0 | NA | NA | NA | NA |
| 300.0 | NA | NA | NA | NA |
| 320.0 | NA | NA | NA | NA |

Positive values indicate scaling tendencies



**Federal F-2
Step Rate Test
8-11-99**



Page 2 of 8

Stimulation Service Report

Stimulation Service
Dowell

| | | | | | | | |
|--|--|---|--|---|--|--|--|
| Customer ANADARKO PETROLEUM COMPANY | | | | Job Number 20118221 | | | |
| Well FEDERAL SWD F-2 | | Location (legal) Vernal, UT | | Dowell Location Vernal, UT | | Job Start 8/11/99 | |
| Field HELPER | | Formation Name/Type Navajo Sand | | Deviation 0° | | Borehole 0 in | |
| County Carbon | | State/Province UT | | BHP 0 psi | | BHT 180 °F | |
| Rig Name | | Drilled For Disposal | | Service Via Land | | Well MD 6,200 ft | |
| Offshore Zone | | Well Class New | | Well Type Rigless | | Well TVD 6,200 ft | |
| Primary Treating Field 2% KCL | | Polymer Loading 0 lb/1000gal | | Fluid Density 8.462 lb/gal | | Pure Pres Gradient 0 psi/ft | |
| Service Line Fracturing | | Job Type Frac, Misc/Incomplete | | Casing Depth, ft: 6200, Size, in: 6.5, Weight, lb/ft: 15.5, Grade: K55, Thread: 6RD | | Tubing Depth, ft: 5600, Size, in: 2.875, Weight, lb/ft: 6.5, Grade: J55, Thread: N/A | |
| Max. Allowed Tubing Pressure 3800 psi | | Max. Allowed Ann. Pressure 1000 psi | | Wellhead Connection 2 7/8" 6.5" T/S | | Perforated Intervals | |
| Service Instructions Break down perforations with 250 bbl of 2% KCL @ 8 bpm. Stop rate test. | | | | Top, ft 6155 | | Bottom, ft 6155 | |
| | | | | SPR 2.9169960 | | No. of Shots 1476 | |
| | | | | | | Total Interval ft | |
| | | | | | | Diameter in | |
| | | | | Treat Down Tubing | | Displacement 33 bbl | |
| | | | | Packer Type -String Retrieval | | Packer Depth 5600 ft | |
| Job Scheduled For: 8/11/99 6:30 | | Arrived on Location: 8/11/99 12:00 | | Leave Location: 8/11/99 12:00 | | Tubing Vol. 32.4 bbl | |
| | | | | | | Casing Vol. 147.56 bbl | |
| | | | | | | Annular Vol. 88.5 bbl | |
| | | | | | | Open Hole Vol. 0 bbl | |

| Time | Control | Pressure UT | Temp | Message | | | | |
|-------------|---------|-------------|-------|---------|---|---|---|------------------------------|
| 24 hr clock | psi | psi | bpm | | | | | |
| 8:34 | 0 | -27.47 | 0 | 0 | 0 | 0 | 0 | Held pre job safety meeting. |
| 8:35 | 0 | -20.29 | 0 | 0 | 0 | 0 | 0 | |
| 8:36 | 0 | 13.14 | .2557 | 0 | 0 | 0 | 0 | |
| 8:38 | .2056 | 31.29 | .2665 | 0 | 0 | 0 | 0 | Fill Hole. |
| 8:39 | .3347 | 31.98 | .2612 | 0 | 0 | 0 | 0 | |
| 8:37 | .4612 | 31.65 | .2514 | 0 | 0 | 0 | 0 | |
| 8:37 | .5865 | 19.79 | .2164 | 0 | 0 | 0 | 0 | |
| 8:38 | 1.322 | 39.96 | .6546 | 0 | 0 | 0 | 0 | Start 1/2 bpm stage. |
| 8:38 | 1.636 | -3.157 | .6246 | 0 | 0 | 0 | 0 | |
| 8:39 | 1.942 | -6.151 | .6074 | 0 | 0 | 0 | 0 | |
| 8:39 | 2.246 | -5.065 | .6063 | 0 | 0 | 0 | 0 | |
| 8:40 | 2.549 | -8.545 | .606 | 0 | 0 | 0 | 0 | |
| 8:40 | 2.852 | -1.915 | .6058 | 0 | 0 | 0 | 0 | |
| 8:41 | 3.155 | 0 | .5965 | 0 | 0 | 0 | 0 | |
| 8:41 | 3.458 | -.0326 | .606 | 0 | 0 | 0 | 0 | Well on a vac. |
| 8:42 | 3.76 | 0 | .6058 | 0 | 0 | 0 | 0 | |
| 8:42 | 4.232 | 70.96 | 1.069 | 0 | 0 | 0 | 0 | Start 1 bpm stage. |
| 8:43 | 4.771 | 82.83 | 1.067 | 0 | 0 | 0 | 0 | |
| 8:43 | 5.31 | 89.29 | 1.069 | 0 | 0 | 0 | 0 | |
| 8:44 | 5.849 | 94.99 | 1.075 | 0 | 0 | 0 | 0 | |
| 8:44 | 6.387 | 96.57 | 1.067 | 0 | 0 | 0 | 0 | |
| 8:45 | 6.926 | 97.2 | 1.067 | 0 | 0 | 0 | 0 | |
| 8:45 | 7.465 | 100.7 | 1.075 | 0 | 0 | 0 | 0 | |
| 8:46 | 8.004 | 102.8 | 1.065 | 0 | 0 | 0 | 0 | |
| 8:46 | 8.542 | 105.3 | 1.066 | 0 | 0 | 0 | 0 | |
| 8:47 | 9.081 | 107.3 | 1.066 | 0 | 0 | 0 | 0 | |
| 8:47 | 9.62 | 109.7 | 1.066 | 0 | 0 | 0 | 0 | |
| 8:48 | 10.16 | 109.9 | 1.066 | 0 | 0 | 0 | 0 | |
| 8:48 | 10.7 | 112.2 | 1.066 | 0 | 0 | 0 | 0 | |

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| FEDERAL SWD #F-2 | | | | HELPER | | Service Data | | Customer | | Job Number |
|------------------|---------|-------------|--------------|--------|---|--------------|---|---------------------|--|----------------------|
| Time | Control | Pressure UI | Top Pressure | | | | | DARKO PETROLEUM COM | | 20119221 |
| 24 hr clock | psi | psi | bpm | | | | | | | Message |
| 8:49 | 11.24 | 114.3 | 1.089 | 0 | 0 | 0 | 0 | 0 | | |
| 8:49 | 11.77 | 116.5 | 1.068 | 0 | 0 | 0 | 0 | 0 | | |
| 8:50 | 12.31 | 118.6 | 1.069 | 0 | 0 | 0 | 0 | 0 | | |
| 8:50 | 12.65 | 119 | 1.069 | 0 | 0 | 0 | 0 | 0 | | |
| 8:51 | 13.39 | 119.3 | 1.075 | 0 | 0 | 0 | 0 | 0 | | |
| 8:51 | 13.93 | 122.4 | 1.089 | 0 | 0 | 0 | 0 | 0 | | |
| 8:52 | 14.59 | 242.3 | 1.712 | 0 | 0 | 0 | 0 | 0 | | |
| 8:52 | 15.46 | 260.4 | 1.726 | 0 | 0 | 0 | 0 | 0 | | Start 1.5 bpm stage. |
| 8:53 | 16.32 | 266 | 1.719 | 0 | 0 | 0 | 0 | 0 | | |
| 8:53 | 17.19 | 265.7 | 1.719 | 0 | 0 | 0 | 0 | 0 | | |
| 8:54 | 18.06 | 268.9 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:54 | 18.93 | 273.4 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 8:55 | 19.79 | 274.5 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:55 | 20.66 | 273.6 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:56 | 21.63 | 272.3 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 8:56 | 22.4 | 275.6 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 8:57 | 23.26 | 276 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:57 | 24.13 | 276.6 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:58 | 25 | 277.9 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 8:58 | 25.67 | 276.7 | 1.716 | 0 | 0 | 0 | 0 | 0 | | |
| 8:59 | 26.73 | 277.5 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 8:59 | 27.6 | 279.2 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 9:00 | 28.47 | 281.7 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 9:00 | 29.33 | 279.9 | 1.719 | 0 | 0 | 0 | 0 | 0 | | |
| 9:01 | 30.2 | 283.8 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 9:01 | 31.07 | 283.1 | 1.727 | 0 | 0 | 0 | 0 | 0 | | |
| 9:02 | 32 | 342.6 | 2.084 | 0 | 0 | 0 | 0 | 0 | | Start 2 bpm stage. |
| 9:02 | 33.05 | 346.3 | 2.091 | 0 | 0 | 0 | 0 | 0 | | |
| 9:03 | 34.1 | 349.3 | 2.09 | 0 | 0 | 0 | 0 | 0 | | |
| 9:03 | 35.16 | 351.7 | 2.09 | 0 | 0 | 0 | 0 | 0 | | |
| 9:04 | 36.21 | 347.2 | 2.092 | 0 | 0 | 0 | 0 | 0 | | |
| 9:05 | 37.26 | 356.9 | 2.094 | 0 | 0 | 0 | 0 | 0 | | |
| 9:05 | 38.31 | 354.5 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:06 | 39.36 | 345.6 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:06 | 40.42 | 346.4 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:07 | 41.47 | 347.5 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:07 | 42.52 | 353.4 | 2.082 | 0 | 0 | 0 | 0 | 0 | | |
| 9:08 | 43.57 | 350.6 | 2.085 | 0 | 0 | 0 | 0 | 0 | | |
| 9:08 | 44.63 | 352.2 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:09 | 45.68 | 352 | 2.091 | 0 | 0 | 0 | 0 | 0 | | |
| 9:09 | 46.73 | 353.2 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:10 | 47.78 | 351.2 | 2.091 | 0 | 0 | 0 | 0 | 0 | | |
| 9:10 | 48.83 | 354.2 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:11 | 49.89 | 351.6 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:11 | 50.94 | 345.8 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:12 | 51.99 | 349.8 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:12 | 53.22 | 433.6 | 2.573 | 0 | 0 | 0 | 0 | 0 | | Start 3.0 bpm stage. |
| 9:13 | 54.51 | 429.5 | 2.574 | 0 | 0 | 0 | 0 | 0 | | |
| 9:13 | 55.81 | 430.7 | 2.577 | 0 | 0 | 0 | 0 | 0 | | |
| 9:14 | 57.11 | 436.5 | 2.577 | 0 | 0 | 0 | 0 | 0 | | |
| 9:14 | 58.41 | 433 | 2.58 | 0 | 0 | 0 | 0 | 0 | | |
| 9:15 | 59.71 | 434.9 | 2.579 | 0 | 0 | 0 | 0 | 0 | | |
| 9:15 | 61.01 | 427.6 | 2.589 | 0 | 0 | 0 | 0 | 0 | | |
| 9:16 | 62.31 | 426.6 | 2.58 | 0 | 0 | 0 | 0 | 0 | | |

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| Well | | | | Pac | | Service Date | | Customer | | Job Number |
|------------------|-------|-------------|-------------|--------|---|--------------|---|---------------------|--|----------------------|
| FEDERAL SWD #F-2 | | | | HELPER | | | | DARKO PETROLEUM COM | | 30119221 |
| Time | Depth | Pressure UI | Temperature | | | | | | | Message |
| 24 hr clock | ft | psi | bpm | | | | | | | |
| 9:16 | 63.61 | 434 | 2.58 | 0 | 0 | 0 | 0 | 0 | | |
| 9:17 | 64.91 | 427.3 | 2.587 | 0 | 0 | 0 | 0 | 0 | | |
| 9:17 | 66.21 | 429.8 | 2.59 | 0 | 0 | 0 | 0 | 0 | | |
| 9:18 | 67.51 | 434.1 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:18 | 68.82 | 423.9 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:19 | 70.12 | 431.8 | 2.582 | 0 | 0 | 0 | 0 | 0 | | |
| 9:19 | 71.42 | 430 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:20 | 72.72 | 424.3 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:20 | 74.03 | 427.1 | 2.592 | 0 | 0 | 0 | 0 | 0 | | |
| 9:21 | 75.33 | 424.7 | 2.585 | 0 | 0 | 0 | 0 | 0 | | |
| 9:21 | 76.63 | 424.3 | 2.584 | 0 | 0 | 0 | 0 | 0 | | |
| 9:22 | 77.93 | 476.8 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:22 | 79.48 | 526.9 | 3.149 | 0 | 0 | 0 | 0 | 0 | | Start 3 bpm stage. |
| 9:23 | 81.04 | 525.9 | 3.139 | 0 | 0 | 0 | 0 | 0 | | |
| 9:23 | 82.62 | 522.8 | 3.137 | 0 | 0 | 0 | 0 | 0 | | |
| 9:24 | 84.2 | 518.8 | 3.136 | 0 | 0 | 0 | 0 | 0 | | |
| 9:24 | 85.79 | 527 | 3.134 | 0 | 0 | 0 | 0 | 0 | | |
| 9:25 | 87.37 | 527.3 | 3.142 | 0 | 0 | 0 | 0 | 0 | | |
| 9:25 | 88.94 | 522 | 3.136 | 0 | 0 | 0 | 0 | 0 | | |
| 9:26 | 90.52 | 520.5 | 3.136 | 0 | 0 | 0 | 0 | 0 | | |
| 9:26 | 92.1 | 517.8 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:27 | 93.68 | 515.9 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:27 | 95.25 | 518.9 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:28 | 96.83 | 519.2 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:28 | 98.41 | 515.5 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:29 | 99.99 | 520.1 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:29 | 101.6 | 526.3 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:30 | 103.1 | 519.7 | 3.131 | 0 | 0 | 0 | 0 | 0 | | |
| 9:30 | 104.7 | 521.5 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:31 | 106.3 | 513.6 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:31 | 107.9 | 514.1 | 3.131 | 0 | 0 | 0 | 0 | 0 | | |
| 9:32 | 109.4 | 520 | 3.15 | 0 | 0 | 0 | 0 | 0 | | |
| 9:32 | 111.2 | 597.7 | 3.533 | 0 | 0 | 0 | 0 | 0 | | Start 3.5 bpm stage. |
| 9:33 | 113 | 594.4 | 3.531 | 0 | 0 | 0 | 0 | 0 | | |
| 9:33 | 114.7 | 592.2 | 3.532 | 0 | 0 | 0 | 0 | 0 | | |
| 9:34 | 116.5 | 592.7 | 3.532 | 0 | 0 | 0 | 0 | 0 | | |
| 9:34 | 118.3 | 594.8 | 3.532 | 0 | 0 | 0 | 0 | 0 | | |
| 9:35 | 120.1 | 595.3 | 3.542 | 0 | 0 | 0 | 0 | 0 | | |
| 9:35 | 121.9 | 591.6 | 3.54 | 0 | 0 | 0 | 0 | 0 | | |
| 9:36 | 123.6 | 594.1 | 3.534 | 0 | 0 | 0 | 0 | 0 | | |
| 9:36 | 125.4 | 594.6 | 3.534 | 0 | 0 | 0 | 0 | 0 | | |
| 9:37 | 127.2 | 592.8 | 3.542 | 0 | 0 | 0 | 0 | 0 | | |
| 9:37 | 129 | 598 | 3.542 | 0 | 0 | 0 | 0 | 0 | | |
| 9:38 | 130.8 | 599.2 | 3.543 | 0 | 0 | 0 | 0 | 0 | | |
| 9:38 | 132.6 | 593.5 | 3.543 | 0 | 0 | 0 | 0 | 0 | | |
| 9:39 | 134.3 | 588.7 | 3.544 | 0 | 0 | 0 | 0 | 0 | | |
| 9:39 | 136.1 | 596.6 | 3.536 | 0 | 0 | 0 | 0 | 0 | | |
| 9:40 | 137.9 | 591.1 | 3.544 | 0 | 0 | 0 | 0 | 0 | | |
| 9:40 | 139.7 | 590.3 | 3.545 | 0 | 0 | 0 | 0 | 0 | | |
| 9:41 | 141.5 | 590.8 | 3.547 | 0 | 0 | 0 | 0 | 0 | | |
| 9:41 | 143.3 | 587.8 | 3.546 | 0 | 0 | 0 | 0 | 0 | | |
| 9:42 | 145.1 | 630.9 | 3.721 | 0 | 0 | 0 | 0 | 0 | | |
| 9:42 | 147.1 | 701.4 | 4.072 | 0 | 0 | 0 | 0 | 0 | | Start 4 bpm stage. |
| 9:43 | 149.1 | 698.1 | 4.062 | 0 | 0 | 0 | 0 | 0 | | |

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| Well | | | Field | | | Service Data | | Customer | Job Number |
|------------------|---------|-------------|---------------|---|---|--------------|---|---------------------|----------------------------------|
| FEDERAL SWD #F-2 | | | HELPER | | | | | DARKO PETROLEUM COM | 20116221 |
| Time | Control | Pressure U1 | Test Pressure | | | | | | |
| 24 hr clock | psi | psi | Rate bpm | | | | | Message | |
| 9:43 | 151.2 | 694.4 | 4.057 | 0 | 0 | 0 | 0 | 0 | |
| 9:44 | 153.2 | 713 | 4.072 | 0 | 0 | 0 | 0 | 0 | |
| 9:44 | 155.3 | 704.6 | 4.063 | 0 | 0 | 0 | 0 | 0 | |
| 9:45 | 157.3 | 701 | 4.063 | 0 | 0 | 0 | 0 | 0 | |
| 9:45 | 159.4 | 699.6 | 4.072 | 0 | 0 | 0 | 0 | 0 | |
| 9:46 | 161.4 | 697.1 | 4.064 | 0 | 0 | 0 | 0 | 0 | |
| 9:46 | 163.5 | 696.6 | 4.073 | 0 | 0 | 0 | 0 | 0 | |
| 9:47 | 165.5 | 698 | 4.065 | 0 | 0 | 0 | 0 | 0 | |
| 9:47 | 167.6 | 697.6 | 4.074 | 0 | 0 | 0 | 0 | 0 | |
| 9:48 | 169.6 | 696.2 | 4.069 | 0 | 0 | 0 | 0 | 0 | |
| 9:48 | 171.7 | 696.6 | 4.066 | 0 | 0 | 0 | 0 | 0 | |
| 9:49 | 173.7 | 693.8 | 4.074 | 0 | 0 | 0 | 0 | 0 | |
| 9:49 | 175.6 | 693.4 | 4.067 | 0 | 0 | 0 | 0 | 0 | |
| 9:50 | 177.6 | 694.7 | 4.076 | 0 | 0 | 0 | 0 | 0 | |
| 9:50 | 179.9 | 690.5 | 4.065 | 0 | 0 | 0 | 0 | 0 | |
| 9:51 | 181.9 | 685.4 | 4.075 | 0 | 0 | 0 | 0 | 0 | |
| 9:51 | 184 | 685.4 | 4.075 | 0 | 0 | 0 | 0 | 0 | |
| 9:52 | 186.1 | 763.2 | 4.462 | 0 | 0 | 0 | 0 | 0 | Start 4.5 bpm stage. |
| 9:52 | 188.4 | 811.3 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 9:53 | 190.7 | 810 | 4.565 | 0 | 0 | 0 | 0 | 0 | |
| 9:53 | 192.9 | 813 | 4.565 | 0 | 0 | 0 | 0 | 0 | |
| 9:54 | 195.2 | 811.6 | 4.574 | 0 | 0 | 0 | 0 | 0 | |
| 9:54 | 197.5 | 808.9 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 9:55 | 199.8 | 814.2 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 9:55 | 202.1 | 809.2 | 4.565 | 0 | 0 | 0 | 0 | 0 | |
| 9:56 | 204.4 | 802.3 | 4.571 | 0 | 0 | 0 | 0 | 0 | |
| 9:56 | 206.7 | 812 | 4.571 | 0 | 0 | 0 | 0 | 0 | |
| 9:57 | 209 | 801.9 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 9:57 | 211.3 | 807 | 4.565 | 0 | 0 | 0 | 0 | 0 | |
| 9:58 | 213.6 | 804 | 4.574 | 0 | 0 | 0 | 0 | 0 | |
| 9:58 | 215.9 | 808.9 | 4.572 | 0 | 0 | 0 | 0 | 0 | |
| 9:59 | 218.2 | 814.4 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 9:59 | 220.5 | 810.9 | 4.563 | 0 | 0 | 0 | 0 | 0 | |
| 10:00 | 222.8 | 794.4 | 4.566 | 0 | 0 | 0 | 0 | 0 | |
| 10:00 | 225.1 | 800.6 | 4.571 | 0 | 0 | 0 | 0 | 0 | |
| 10:01 | 227.4 | 807 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 10:01 | 229.7 | 808 | 4.564 | 0 | 0 | 0 | 0 | 0 | |
| 10:02 | 231.2 | 815.8 | 3.714 | 0 | 0 | 0 | 0 | 0 | Start 6 bpm stage. |
| 10:02 | 231.3 | 774.4 | 2.769 | 0 | 0 | 0 | 0 | 0 | Not reading rate from frac pump. |
| 10:03 | 231.4 | 669.4 | 3.135 | 0 | 0 | 0 | 0 | 0 | |
| 10:03 | 231.6 | 942.1 | 3.072 | 0 | 0 | 0 | 0 | 0 | |
| 10:04 | 231.8 | 929.5 | 3.067 | 0 | 0 | 0 | 0 | 0 | |
| 10:04 | 231.9 | 915.7 | 3.048 | 0 | 0 | 0 | 0 | 0 | |
| 10:05 | 231.9 | 944.5 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:05 | 232.1 | 929.4 | 3.078 | 0 | 0 | 0 | 0 | 0 | |
| 10:06 | 232.2 | 922.1 | 3.063 | 0 | 0 | 0 | 0 | 0 | |
| 10:06 | 232.4 | 921.5 | 3.079 | 0 | 0 | 0 | 0 | 0 | |
| 10:07 | 232.5 | 898.8 | 3.066 | 0 | 0 | 0 | 0 | 0 | |
| 10:07 | 232.7 | 870.2 | 3.065 | 0 | 0 | 0 | 0 | 0 | |
| 10:08 | 232.8 | 837.9 | 3.066 | 0 | 0 | 0 | 0 | 0 | |
| 10:08 | 233 | 852.2 | 3.065 | 0 | 0 | 0 | 0 | 0 | |
| 10:09 | 233.1 | 773.1 | 3.078 | 0 | 0 | 0 | 0 | 0 | |
| 10:09 | 233.3 | 931.7 | 3.06 | 0 | 0 | 0 | 0 | 0 | |
| 10:10 | 233.4 | 954.9 | 3.062 | 0 | 0 | 0 | 0 | 0 | |

there what is it reading?

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| FEDERAL SWD #F-2 | | | | HELPER | | Service Date | | Customer | | Job Number |
|------------------|---------|----------------|----------------|--------|---|--------------|---|---------------------|----------------------------|------------|
| Time | Control | Pressure (psi) | Flowrate (bpm) | | | | | DARKO PETROLEUM COM | | 20118221 |
| 24 hr clock | psi | psi | bpm | | | | | | Message | |
| 10:10 | 233.8 | 952.9 | .3084 | 0 | 0 | 0 | 0 | 0 | | |
| 10:11 | 233.8 | 954 | .3086 | 0 | 0 | 0 | 0 | 0 | | |
| 10:11 | 233.9 | 934.2 | .3081 | 0 | 0 | 0 | 0 | 0 | | |
| 10:12 | 234.1 | 937.9 | .3081 | 0 | 0 | 0 | 0 | 0 | | |
| 10:12 | 234.2 | 942.2 | .308 | 0 | 0 | 0 | 0 | 0 | | |
| 10:13 | 234.4 | 928.8 | .3072 | 0 | 0 | 0 | 0 | 0 | | |
| 10:13 | 234.6 | 228.5 | 0 | 0 | 0 | 0 | 0 | 0 | End 5 bpm stage. | |
| 10:14 | 234.5 | 204 | 0 | 0 | 0 | 0 | 0 | 0 | Shut down, wait on water. | |
| 10:14 | 234.5 | 188.6 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:15 | 234.5 | 178.8 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:16 | 234.5 | 169.6 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:16 | 234.5 | 161.7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:17 | 234.5 | 155.7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:17 | 234.5 | 147 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:18 | 234.5 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:18 | 234.5 | 133.9 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:19 | 234.5 | 128.3 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:19 | 234.5 | 123.7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:20 | 234.6 | 116 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:20 | 234.5 | 110.4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:21 | 234.5 | 105.4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:21 | 234.5 | 100.8 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:22 | 234.5 | 96.16 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:22 | 234.5 | 91.58 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:23 | 234.5 | 84.96 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:23 | 234.5 | 794.3 | .2829 | 0 | 0 | 0 | 0 | 0 | Start 6 bpm stage. | |
| 10:24 | 234.7 | 1231 | .3718 | 0 | 0 | 0 | 0 | 0 | | |
| 10:24 | 234.9 | 1249 | .3722 | 0 | 0 | 0 | 0 | 0 | | |
| 10:25 | 235.1 | 1247 | .3723 | 0 | 0 | 0 | 0 | 0 | | |
| 10:25 | 235.2 | 1208 | .3656 | 0 | 0 | 0 | 0 | 0 | | |
| 10:26 | 235.4 | 1226 | .3688 | 0 | 0 | 0 | 0 | 0 | | |
| 10:26 | 235.6 | 1236 | .3682 | 0 | 0 | 0 | 0 | 0 | | |
| 10:27 | 235.8 | 1258 | .3714 | 0 | 0 | 0 | 0 | 0 | | |
| 10:27 | 236 | 1250 | .3717 | 0 | 0 | 0 | 0 | 0 | | |
| 10:28 | 236.2 | 1237 | .371 | 0 | 0 | 0 | 0 | 0 | | |
| 10:28 | 236.4 | 1252 | .3685 | 0 | 0 | 0 | 0 | 0 | | |
| 10:29 | 236.5 | 1257 | .3703 | 0 | 0 | 0 | 0 | 0 | | |
| 10:29 | 236.7 | 1269 | .3703 | 0 | 0 | 0 | 0 | 0 | | |
| 10:30 | 236.9 | 1280 | .3685 | 0 | 0 | 0 | 0 | 0 | | |
| 10:30 | 237.1 | 1256 | .371 | 0 | 0 | 0 | 0 | 0 | | |
| 10:31 | 237.3 | 1263 | .3703 | 0 | 0 | 0 | 0 | 0 | | |
| 10:31 | 237.5 | 1259 | .3704 | 0 | 0 | 0 | 0 | 0 | | |
| 10:32 | 237.7 | 1275 | .3702 | 0 | 0 | 0 | 0 | 0 | | |
| 10:32 | 237.8 | 1282 | .3702 | 0 | 0 | 0 | 0 | 0 | | |
| 10:33 | 238 | 752.3 | .2481 | 0 | 0 | 0 | 0 | 0 | | |
| 10:33 | 238.1 | 232.4 | 0 | 0 | 0 | 0 | 0 | 0 | Shut down, 6 bpm complete. | |
| 10:34 | 238.1 | 221.9 | 0 | 0 | 0 | 0 | 0 | 0 | ISIP 230 psi. | |
| 10:34 | 238.1 | 210.2 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:35 | 238.1 | 202.4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:35 | 238.1 | 196.9 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:36 | 238.1 | 187.9 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:36 | 238.1 | 183.2 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:37 | 238.1 | 174.5 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:37 | 238.1 | 169.5 | 0 | 0 | 0 | 0 | 0 | 0 | | |

Page 7 of 8

| Well | | | Field | | | Service Date | | Customer | | Job Number | |
|------------------|----------|----------------|--------------|---|---|--------------|---|---------------------|---|--------------------|--|
| FEDERAL SWD #F-2 | | | HELPER | | | | | DARKO PETROLEUM COM | | 20119221 | |
| Time | Quantity | Pressure (psi) | Total Volume | | | | | | | Message | |
| 24 hr clock | bbl | psi | sqm | | | | | | | | |
| 10:38 | 238.1 | 164.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:38 | 238.1 | 160.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:39 | 238.1 | 151.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 minute 160 psi. | |
| 10:39 | 238.1 | 148.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:40 | 238.1 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:40 | 238.1 | 137.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:41 | 238.1 | 132.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:41 | 238.1 | 128.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:42 | 238.1 | 123.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:42 | 238.1 | 119.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:43 | 238.1 | 114.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:43 | 238.1 | 109.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 minute 110 psi. | |
| 10:44 | 238.1 | 105.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:44 | 238.1 | 105.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:45 | 238.1 | 100.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:45 | 238.1 | 98.47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:46 | 238.1 | 93.44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:46 | 238.1 | 91.58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:47 | 238.1 | 87.03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:47 | 238.1 | 82.57 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:48 | 238.1 | 78.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:48 | 238.1 | 77.84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:49 | 238.1 | 73.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 minute 73 psi. | |
| 10:49 | 238.1 | 68.93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Job complete. | |
| 10:50 | 238.1 | 66.68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:50 | 238.1 | 64.11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:51 | 238.1 | 59.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| Post Job Summary | | | | | | | | | |
|------------------------------|----|-----|--------------|--|-------------------------------|------|-----|-----|----------|
| Average Injection Rates, bpm | | | | | Volume of Fluid Injected, bbl | | | | |
| Field | W2 | OO2 | Maximum Rate | | Open Field | Acid | Oil | OO2 | W2 (ccf) |
| 4 | 0 | 0 | 6 | | 340 | 0 | 0 | 0 | 0 |

| Treating Pressure Summary, psi | | | | | | Quantity of & placed, lb | |
|--------------------------------|---------|-------|---------|--------------|----|--------------------------|------------------------|
| Breakdown | Maximum | Final | Average | 15 Min. 150' | | Total Injected | Total Ordered/Designed |
| 0 | 1275 | 1270 | 600 | 230 | 73 | 0 | 0 |

| W2 Percent | OO2 Percent | Designed Fluid Volume | Displacement | Slurry Volume | Pad Volume | Percent Pad |
|------------|-------------|-----------------------|--------------|---------------|------------|-------------|
| 0% | 0% | 14000 gal | 0 bbl | 340 bbl | 0 gal | 0 % |

| Customer or Authorized Representative | Dowell Supervisor | Number of Stages | Fracture Gradient | <input checked="" type="checkbox"/> Job Completed |
|---------------------------------------|-------------------|------------------|-------------------|---|
| Dick Dietz | Selwyn Simper | 0 | 0.46 psi/ft | <input type="checkbox"/> Screen Out |

789-0411

Gary Dimmick

Marty Hiatt



November 24, 1997

Anadarko Petroleum Corporation
17001 Northchase Drive
P.O. Box 1330
Houston, TX 77251-1330

ATTN: Mr. Shad Frazier

Subject: Hydrogeologic Assessment in the Vicinity of Anadarko
Ferron Coalbed Methane Water-Disposal Well Helper State SWD # 1

Dear Mr. Frazier:

This letter-report is a summary of findings of an evaluation of general groundwater quality and hydrogeologic conditions in the vicinity of the Anadarko North Area Ferron Coalbed Methane project in Carbon County, Utah.

Project Background and Scope

It is our understanding that Anadarko has completed water-disposal well Helper State SWD #1 at 1,131' FSL, 2,194' FWL of Section 3, Township 14 South, Range 10 East, in Carbon County, Utah. The well was drilled to a depth of 6,488 feet, and is completed in the Navajo Sandstone and Wingate Sandstone. The well will be used to dispose of water removed from nearby existing and proposed coalbed methane production wells completed in the Ferron Sandstone at depths of approximately 2,100 feet.

The purpose of this report is to provide Anadarko with an independent evaluation of hydrogeologic conditions in the area of the disposal well, specifically those in the Navajo Sandstone Aquifer. The scope of our services included the collection and analysis of available information for permitted water-supply and oil and gas wells within a five-mile radius of the disposal well site, and review and interpretation of available geologic maps and reports for the area. Data sources included:

- Utah Department of Natural Resources Division of Water Rights database, files, and reports
- Utah Department of Natural Resources Division of Water Resources reports
- Utah Division of Oil, Gas and Mining (UDOGM) files
- Utah Geological Survey reports and maps
- U.S. Geological Survey (USGS) database, reports, and maps

Geology of the Navajo Sandstone

The Lower Jurassic Navajo Sandstone is a light-brown to light-gray, thick-bedded to massive, cross-bedded quartzose sandstone. The Navajo is generally fine-grained, clean and friable. The formation contains a few thin lenticular, light-gray limestone beds in the upper part (Witkind, 1995). Navajo exposures range from steep cliffs to rounded knolls and nearly flat terrain. The Navajo Sandstone ranges in thickness from 400 to 1,000 feet along the west flank of the San Rafael Swell, and is projected to be approximately 300 feet thick in the vicinity of Helper State SWD #1 (Hood and Patterson, 1984, Plate 6; attached Figure 1). In the vicinity of Helper, the Navajo Sandstone strikes generally northeast and dips from 3 to 7 degrees west (Witkind, 1988).

Groundwater Occurrence

SWD #1 4300730361 T14S, R10E S.3 6489TD

Groundwater in the area north of the San Rafael Swell occurs under confined, unconfined, and perched conditions. Most water in the unconsolidated surficial deposits is unconfined and saline, due to dissolution of evaporite minerals. Perched conditions occur in partially or fully-saturated strata underlain by less-permeable, unsaturated rocks. Water in consolidated strata such as the Navajo Sandstone is unconfined in and near outcrops around the perimeter of the Swell, where recharge to the aquifer occurs (see attached Figure 2). Downgradient and downdip from the recharge areas, the water level in the confined aquifer intersects the contact with an overlying confining layer, and groundwater is under confined conditions. In the San Rafael Swell, the Carmel Formation serves as the confining layer above the Navajo Sandstone.

Groundwater Movement

According to information extrapolated from Hood and Patterson (1984, Plate 5) the potentiometric surface of groundwater in the Navajo Sandstone is approximately 5,100 feet above mean sea level (about 900 feet below ground level) in the vicinity of Helper State SWD #1 (see Figure 2). Groundwater in the Navajo Sandstone is recharged by infiltration into exposures of the formation around the flanks of the San Rafael Swell. Recharge along the west flank flows downdip (westerly) toward Castle Valley (Figure 2). Approximately 20 miles south of Castle Dale, the west-flank groundwater flow in the Navajo splits into north and south components (Hood and Patterson, 1984, Plate 5; Weiss, 1987, Figure 7). The direction of groundwater movement in the Navajo north of the groundwater divide (in the area of Castle Dale) is north-northeast; in the area of Price and Helper groundwater flows east-northeast. Groundwater flow in the Navajo continues clockwise around the north end of the San Rafael Swell, and generally southwest along the east flank of the Swell, until it intercepts and discharges to the Green River.

Based on analysis of shallow (less than 5 feet in depth) bedrock cores and outcrop samples, the porosity of the Navajo Sandstone in the northern San Rafael Swell area ranges

from 3.6 to 26.8 percent (averaging 17.7 percent), and hydraulic conductivities range from 0.0037 to 5.1 feet per day (Hood and Patterson, 1984). As extrapolated from Hood and Patterson's potentiometric contour map (1984, Plate 5; attached Figure 2), the hydraulic gradient of groundwater in the Navajo near Helper is easterly, at 0.0013.

The horizontal rate of groundwater flow (or average linear velocity) can be calculated using a modified form of the Darcy Equation (Freeze and Cherry, 1979):

$$v = (K/n) (dh/dl)$$

where:

| | | |
|-------|---|--|
| v | = | average linear velocity (feet per day) |
| K | = | hydraulic conductivity (feet per day) |
| n | = | porosity (fraction) |
| dh/dl | = | hydraulic gradient (feet/foot) |

Using the published range of values for K and n and the calculated dh/dl discussed above, the calculated average linear velocity of groundwater in the Navajo Sandstone in the northern San Rafael area may range from 0.007 feet per year (under low conductivity, high porosity conditions) to 67 feet per year (under high conductivity, low porosity conditions). Note that these velocities are not based on site-specific data, but are calculated using hydraulic characteristics of near-surface, weathered samples. It is probable that the velocity of groundwater flow in the formation as a whole, and particularly in the unweathered formation at depth, is more in line with the lower velocity.

Near Caineville (approximately 95 miles due south of Helper), cores of Navajo Sandstone from 1,000 to 2,000 feet below ground surface had an average horizontal hydraulic conductivity (K) of 0.5 feet per day (Hood and Danielson, 1979, pg. 36). Assuming that the K value of these cores is more representative of the hydraulic conductivity of the Navajo at depth in the Castle Dale area, and assuming the 17.7 percent average porosity and 0.0013 hydraulic gradient extrapolated from Hood and Patterson (1984), an average linear velocity of 1.34 feet per year is derived.

Groundwater Use

Deep-source groundwater use in Carbon County is very limited. A review of recorded water rights for the 120 sections within an approximate 5-mile radius of Helper State SWD #1 revealed a total of 675 water rights. Of these, 633 are surface rights on creeks and springs, and 42 are underground water rights for wells. Of the 42 underground water rights, only 10 have Well Driller Reports on file with the Utah Division of Water Rights. Nine of these wells are less than 200 feet deep; the remaining well was drilled by Mountain Fuel Supply to 958 feet and produced brackish water. According to the Utah Division of

Water Rights regional engineer, no water is currently withdrawn from the Navajo Sandstone in Carbon County, and communities rely on surface water and spring flow collected from the Price River and the Wasatch Plateau.

Five test wells were installed in 1981 by Utah Power and Light (UP&L) in Section 1, Township 20 South, Range 9 East and Section 7, Township 20 South, Range 10 East (35 miles south of Helper State SWD #1, see Figure 2). The wells were drilled to the top of the Kayenta Formation and completed in the Navajo at depths ranging from 575 to 882 feet. Navajo thickness ranged from 340 to 404 feet. Although the wells produced water of sufficient quality and quantity for use in UP&L's power plant near Castle Dale, the cost of a conveyance pipeline was determined to be prohibitive, and adequate surface water supplies were available. The wells were donated by UP&L to the Utah Division of Wildlife Resources.

Groundwater Quality

In general, groundwater is saline in much of the northern San Rafael Swell area. Most formations in the Swell contain fresh water only near the recharge areas. Fresh water occurs in the Navajo Sandstone near outcrop areas on the perimeter of the Swell where infiltration of meteoric water flushes out dissolved solids. In most other areas of the northern San Rafael Swell, with increasing distance from recharge areas, water in the Navajo shows degradation by interformational leakage and mixing with saline water from adjacent formations (e.g., the overlying Carmel Formation) which contain gypsum, halite, and other evaporite minerals (Hood and Patterson, 1984).

Water samples collected by UP&L from the Navajo at various depths in the above-mentioned wells were submitted for laboratory analyses of water quality. The analytical results indicate total dissolved solids (TDS) concentrations from 600 to 6,799 milligrams per liter (mg/l). These wells are only 1.5 miles downdip from numerous narrow canyon-bottom exposures of the Navajo, and only 3 miles downdip of broad Navajo exposures with little relief. The relative "freshness" of some of the samples of Navajo groundwater from the UP&L wells is a function of shallow depth and the proximity of the wells to this recharge area.

The salinity of groundwater typically increases with depth of burial and distance from the area of recharge (Freeze and Cherry, 1979, pg. 241-243). This degradation in quality is primarily related to the distance the groundwater has traveled (allowing more time for dissolution of minerals in the formation). Because of this, it is reasonable to expect that water quality in the Navajo Sandstone degrades westward and northward with increasing depth and distance from the outcrop; the Navajo at Helper State SWD #1 is under 6,000 feet of cover and is more than 30 miles downgradient from the nearest recharge area.

According to information on file with the Utah Division of Oil, Gas and Mining, the TDS concentration of groundwater collected from the Navajo Sandstone at the River Gas Corporation Drunkard's Wash injection well D-1 (immediately southwest of Price, Utah) was analyzed at 172,386 milligrams per liter (parts per million [ppm]), which is an extremely saline brine. The Navajo Sandstone at well D-1 is under approximately 5,700 feet of cover, and is about 28 miles north-northwest of the nearest outcrop (recharge area) of the Navajo in the San Rafael Swell. The TDS concentration of water removed from the Ferron Sandstone coal beds at Drunkard's Wash and injected in the Navajo Sandstone at well D-1 is approximately 15,000 ppm; thus, injection of Ferron water actually decreases the salinity of groundwater in the Navajo.

Helper State SWD #1 is perforated across three depth intervals: from 5,920 feet to 6,090 feet and from 6,112 to 6,154 feet (in the Navajo Sandstone); and from 6,256 to 6,320 feet (in the Wingate Sandstone). For the purposes of this report, groundwater in the Wingate Sandstone is not differentiated from that in the Navajo Sandstone Aquifer (i.e., both formations and the interposed Kayenta Formation are considered a single hydrogeologic unit). Groundwater collected from these three zones between November 7 and 12, 1997 contained TDS concentrations of 64,997 ppm, 86,022 ppm, and 107,809 ppm, respectively. A composite sample of water from Anadarko's Ferron Sandstone production wells collected on November 12, 1997 had a TDS concentration of 25,500 ppm. As compared with conditions at Drunkard's Wash, the Navajo groundwater is less saline and the Ferron groundwater is more saline in the vicinity of the Anadarko wells. As at Drunkard's Wash, however, because the Ferron groundwater is more "fresh" than the Navajo groundwater, injection of the produced Ferron water in Helper State SWD #1 will decrease the salinity of water in the Navajo.

Potential Effects of Water-Disposal on Water Quality in the Navajo Aquifer

The effect of Ferron Sandstone groundwater disposal on water quality in the Navajo Sandstone Aquifer in the vicinity of Helper State SWD #1 will depend primarily on the quality of water removed from the Ferron during dewatering and gas production, and the quality of groundwater in the Navajo prior to injection of the Ferron water. Analyses of the Ferron and Navajo groundwaters suggest that injection of saline water from the Ferron may actually improve groundwater quality in the Navajo.

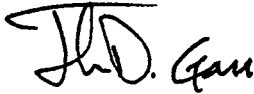
Hood and Patterson (1984, pg. 40) note that the relatively low transmissivity of the Navajo Sandstone results in a restricted cone of depression and steep drawdown under pumping. Because groundwater injection and groundwater withdrawal in confined aquifers have equivalent but inverse effects on the potentiometric surface surrounding the injection or withdrawal point (Freeze and Cherry, 1979, pg. 454), it is reasonable to expect that injection will result in a high, but relatively restricted groundwater mound in the Navajo Sandstone. Considering the upgradient distance to fresher, more usable water in the Navajo (closer to the formation's recharge area 30 miles southeast of Helper State SWD

#1), it is unlikely that injection of Ferron groundwater could adversely affect groundwater quality in the vicinity of future potential water-production sites.

It has been a pleasure to work with you on this project. If you have any questions or require additional information or services, please do not hesitate to call me at (801) 273-2416.

Sincerely,

MONTGOMERY WATSON

A handwritten signature in black ink, appearing to read "John D. Garr". The signature is stylized with a large, sweeping initial "J" and "G".

John D. Garr, R.G.
Supervising Hydrogeologist

Attachments: Figure 1
Figure 2

REFERENCES CITED

- Freeze, R.A., and Cherry, J.A., 1979. Groundwater: Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 604 p.
- Hood, J.W., and Danielson, T.W., 1979. Aquifer tests of the Navajo Sandstone near Caineville, Wayne County, Utah: State of Utah Department of Natural Resources Division of Water Rights Technical Publication No. 66, 69 p.
- Hood, J.W., and Patterson, D.J., 1984. Bedrock aquifers in the northern San Rafael Swell area, Utah, with special emphasis on the Navajo Sandstone: State of Utah Department of Natural Resources Division of Water Rights Technical Publication No. 78, 128 p. text, 5 plates.
- Weiss, E., 1987. Groundwater flow in the Navajo Sandstone in parts of Carbon, Grand, Carbon, Wayne, Garfield, and Kane counties, southeast Utah: U.S. Geological Survey Water-Resources Investigations Report 86-4012, 41 p.
- Witkind, I.J., 1988. Geologic map of the Huntington 30' x 60' quadrangle, Carbon, Carbon, Grand, and Uintah Counties, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1764. 1:100,000-scale.
- Witkind, I. J., 1995. Geologic map of the Price 1_ x 2_ quadrangle, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-2462. 1:250,000-scale.

Page 2 of 8

Stimulation Service Report

Schlumberger

Dowell

| | | | | | | | |
|---|--|---|--|---|--|--|--|
| Customer ANADARKO PETROLEUM COMPANY | | | | Job Number 20118221 | | | |
| Well FEDERAL SWD F-2 | | Location (legal) Vernal, UT | | Dowell Location Vernal, UT | | Job Start 8/11/99 | |
| Field HELPER | | Formation Name/Type Navajo Sand | | Deviation 0° | | Borehole 0 in | |
| County Carbon | | State/Province UT | | BHP 0 psi | | BHT 180 °F | |
| Rig Name | | Drilled For Disposal | | Service Via Land | | Well MD 6,200 ft | |
| Offshore Zone | | Well Class New | | Well Type Rigless | | Well TVD 6,200 ft | |
| Primary Treating Field 2% KCL | | Polymer Loading 0 lb/1000gal | | Fluid Density 8.462 lb/gal | | Pure Pres Gradient 0 psi/ft | |
| Service Line Fracturing | | Job Type Frac, Misc/Incomplete | | Casing Depth, ft: 6200, Size, in: 6.5, Weight, lb/ft: 15.5, Grade: K55, Thread: 6RD | | Tubing Depth, ft: 5600, Size, in: 2.875, Weight, lb/ft: 6.5, Grade: J55, Thread: N/A | |
| Max. Allowed Tubing Pressure 3800 psi | | Max. Allowed Ann. Pressure 1000 psi | | Wellhead Connection 2 7/8" 6.5# T/S | | Perforated Intervals | |
| Service Instructions Break down perforations with 250 bbls of 2% KCL @ 8 bpm. Stop rate test. | | | | Top, ft 6155 | | Bottom, ft 6155 | |
| | | | | SPR 2.9169960 | | No. of Shots 1476 | |
| | | | | | | Total Interval ft | |
| | | | | | | Diameter in | |
| | | | | Treat Down Tubing | | Displacement 33 bbl | |
| | | | | Packer Type -String Retrieval | | Packer Depth 5600 ft | |
| Job Scheduled For: 8/11/99 6:30 | | Arrived on Location: 8/11/99 12:00 | | Leave Location: 8/11/99 12:00 | | Tubing Vol. 32.4 bbl | |
| | | | | | | Casing Vol. 147.56 bbl | |
| | | | | | | Annular Vol. 88.5 bbl | |
| | | | | | | Open Hole Vol. 0 bbl | |

| Time | Control | Pressure UT | Flow Rate | Message | | | | |
|-------------|---------|-------------|-----------|---------|---|---|---|------------------------------|
| 24 hr clock | psi | psi | bpm | | | | | |
| 8:34 | 0 | -27.47 | 0 | 0 | 0 | 0 | 0 | Held pre job safety meeting. |
| 8:35 | 0 | -20.29 | 0 | 0 | 0 | 0 | 0 | |
| 8:36 | 0 | 13.14 | .2557 | 0 | 0 | 0 | 0 | |
| 8:38 | .2056 | 31.29 | .2865 | 0 | 0 | 0 | 0 | Fill Hole. |
| 8:39 | .3347 | 31.98 | .2612 | 0 | 0 | 0 | 0 | |
| 8:37 | .4612 | 31.65 | .2514 | 0 | 0 | 0 | 0 | |
| 8:37 | .5865 | 19.79 | .2164 | 0 | 0 | 0 | 0 | |
| 8:38 | 1.322 | 39.96 | .6546 | 0 | 0 | 0 | 0 | Start 1/2 bpm stage. |
| 8:38 | 1.636 | -3.157 | .6246 | 0 | 0 | 0 | 0 | |
| 8:39 | 1.942 | -6.151 | .6074 | 0 | 0 | 0 | 0 | |
| 8:39 | 2.246 | -5.085 | .6063 | 0 | 0 | 0 | 0 | |
| 8:40 | 2.549 | -8.545 | .606 | 0 | 0 | 0 | 0 | |
| 8:40 | 2.852 | -1.915 | .6058 | 0 | 0 | 0 | 0 | |
| 8:41 | 3.155 | 0 | .5985 | 0 | 0 | 0 | 0 | |
| 8:41 | 3.458 | -.0326 | .606 | 0 | 0 | 0 | 0 | Well on a vac. |
| 8:42 | 3.76 | 0 | .6058 | 0 | 0 | 0 | 0 | |
| 8:42 | 4.232 | 70.96 | 1.069 | 0 | 0 | 0 | 0 | Start 1 bpm stage. |
| 8:43 | 4.771 | 82.83 | 1.067 | 0 | 0 | 0 | 0 | |
| 8:43 | 5.31 | 89.29 | 1.069 | 0 | 0 | 0 | 0 | |
| 8:44 | 5.849 | 94.99 | 1.075 | 0 | 0 | 0 | 0 | |
| 8:44 | 6.387 | 96.57 | 1.067 | 0 | 0 | 0 | 0 | |
| 8:45 | 6.926 | 97.2 | 1.067 | 0 | 0 | 0 | 0 | |
| 8:45 | 7.465 | 100.7 | 1.075 | 0 | 0 | 0 | 0 | |
| 8:46 | 8.004 | 102.8 | 1.085 | 0 | 0 | 0 | 0 | |
| 8:46 | 8.542 | 105.3 | 1.086 | 0 | 0 | 0 | 0 | |
| 8:47 | 9.081 | 107.3 | 1.086 | 0 | 0 | 0 | 0 | |
| 8:47 | 9.62 | 109.7 | 1.086 | 0 | 0 | 0 | 0 | |
| 8:48 | 10.16 | 109.9 | 1.086 | 0 | 0 | 0 | 0 | |
| 8:48 | 10.7 | 112.2 | 1.086 | 0 | 0 | 0 | 0 | |

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| FEDERAL SWD #F-2 | | | | HELPER | | Service Data | | Customer | | Job Number |
|------------------|---------|-------------|--------------|--------|---|--------------|---|---------------------|--|----------------------|
| Time | Control | Pressure UI | Top Pressure | | | | | DARKO PETROLEUM COM | | 20119221 |
| 24 hr clock | psi | psi | bpm | | | | | | | Message |
| 8:49 | 11.24 | 114.3 | 1.089 | 0 | 0 | 0 | 0 | 0 | | |
| 8:49 | 11.77 | 116.5 | 1.068 | 0 | 0 | 0 | 0 | 0 | | |
| 8:50 | 12.31 | 118.6 | 1.069 | 0 | 0 | 0 | 0 | 0 | | |
| 8:50 | 12.65 | 119 | 1.069 | 0 | 0 | 0 | 0 | 0 | | |
| 8:51 | 13.39 | 119.3 | 1.075 | 0 | 0 | 0 | 0 | 0 | | |
| 8:51 | 13.93 | 122.4 | 1.089 | 0 | 0 | 0 | 0 | 0 | | |
| 8:52 | 14.59 | 242.3 | 1.712 | 0 | 0 | 0 | 0 | 0 | | |
| 8:52 | 15.46 | 260.4 | 1.726 | 0 | 0 | 0 | 0 | 0 | | Start 1.5 bpm stage. |
| 8:53 | 16.32 | 266 | 1.719 | 0 | 0 | 0 | 0 | 0 | | |
| 8:53 | 17.19 | 265.7 | 1.719 | 0 | 0 | 0 | 0 | 0 | | |
| 8:54 | 18.06 | 268.9 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:54 | 18.93 | 273.4 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 8:55 | 19.79 | 274.5 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:55 | 20.66 | 273.6 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:56 | 21.63 | 272.3 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 8:56 | 22.4 | 275.6 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 8:57 | 23.26 | 276 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:57 | 24.13 | 276.6 | 1.726 | 0 | 0 | 0 | 0 | 0 | | |
| 8:58 | 25 | 277.9 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 8:58 | 25.67 | 276.7 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 8:59 | 26.73 | 277.5 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 8:59 | 27.6 | 279.2 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 9:00 | 28.47 | 281.7 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 9:00 | 29.33 | 279.9 | 1.718 | 0 | 0 | 0 | 0 | 0 | | |
| 9:01 | 30.2 | 283.8 | 1.725 | 0 | 0 | 0 | 0 | 0 | | |
| 9:01 | 31.07 | 283.1 | 1.727 | 0 | 0 | 0 | 0 | 0 | | |
| 9:02 | 32 | 342.6 | 2.084 | 0 | 0 | 0 | 0 | 0 | | Start 2 bpm stage. |
| 9:02 | 33.05 | 346.3 | 2.091 | 0 | 0 | 0 | 0 | 0 | | |
| 9:03 | 34.1 | 346.3 | 2.09 | 0 | 0 | 0 | 0 | 0 | | |
| 9:03 | 35.16 | 351.7 | 2.09 | 0 | 0 | 0 | 0 | 0 | | |
| 9:04 | 36.21 | 347.2 | 2.092 | 0 | 0 | 0 | 0 | 0 | | |
| 9:05 | 37.26 | 356.9 | 2.094 | 0 | 0 | 0 | 0 | 0 | | |
| 9:05 | 38.31 | 354.5 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:06 | 39.36 | 345.8 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:06 | 40.42 | 346.4 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:07 | 41.47 | 347.5 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:07 | 42.52 | 353.4 | 2.082 | 0 | 0 | 0 | 0 | 0 | | |
| 9:08 | 43.57 | 350.8 | 2.085 | 0 | 0 | 0 | 0 | 0 | | |
| 9:08 | 44.63 | 352.2 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:09 | 45.68 | 352 | 2.091 | 0 | 0 | 0 | 0 | 0 | | |
| 9:09 | 46.73 | 353.2 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:10 | 47.78 | 351.2 | 2.091 | 0 | 0 | 0 | 0 | 0 | | |
| 9:10 | 48.83 | 354.2 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:11 | 49.89 | 351.6 | 2.084 | 0 | 0 | 0 | 0 | 0 | | |
| 9:11 | 50.94 | 345.8 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:12 | 51.99 | 349.8 | 2.093 | 0 | 0 | 0 | 0 | 0 | | |
| 9:12 | 53.22 | 433.6 | 2.573 | 0 | 0 | 0 | 0 | 0 | | Start 3.0 bpm stage. |
| 9:13 | 54.51 | 429.5 | 2.574 | 0 | 0 | 0 | 0 | 0 | | |
| 9:13 | 55.81 | 430.7 | 2.577 | 0 | 0 | 0 | 0 | 0 | | |
| 9:14 | 57.11 | 436.5 | 2.577 | 0 | 0 | 0 | 0 | 0 | | |
| 9:14 | 58.41 | 433 | 2.58 | 0 | 0 | 0 | 0 | 0 | | |
| 9:15 | 59.71 | 434.9 | 2.579 | 0 | 0 | 0 | 0 | 0 | | |
| 9:15 | 61.01 | 427.8 | 2.589 | 0 | 0 | 0 | 0 | 0 | | |
| 9:16 | 62.31 | 428.6 | 2.58 | 0 | 0 | 0 | 0 | 0 | | |

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| Well | | | | Pac | | Service Date | | Customer | | Job Number |
|------------------|-------|-------------|-------------|--------|---|--------------|---|---------------------|--|----------------------|
| FEDERAL SWD #F-2 | | | | HELPER | | | | DARKO PETROLEUM COM | | 30119221 |
| Time | Depth | Pressure UI | Temperature | | | | | | | Message |
| 24 hr clock | ft | psi | bpm | | | | | | | |
| 9:16 | 63.61 | 434 | 2.58 | 0 | 0 | 0 | 0 | 0 | | |
| 9:17 | 64.91 | 427.3 | 2.587 | 0 | 0 | 0 | 0 | 0 | | |
| 9:17 | 66.21 | 429.8 | 2.59 | 0 | 0 | 0 | 0 | 0 | | |
| 9:18 | 67.51 | 434.1 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:18 | 68.82 | 423.9 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:19 | 70.12 | 431.8 | 2.582 | 0 | 0 | 0 | 0 | 0 | | |
| 9:19 | 71.42 | 430 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:20 | 72.72 | 424.3 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:20 | 74.03 | 427.1 | 2.592 | 0 | 0 | 0 | 0 | 0 | | |
| 9:21 | 75.33 | 424.7 | 2.585 | 0 | 0 | 0 | 0 | 0 | | |
| 9:21 | 76.63 | 424.3 | 2.584 | 0 | 0 | 0 | 0 | 0 | | |
| 9:22 | 77.93 | 476.8 | 2.591 | 0 | 0 | 0 | 0 | 0 | | |
| 9:22 | 79.48 | 526.9 | 3.149 | 0 | 0 | 0 | 0 | 0 | | Start 3 bpm stage. |
| 9:23 | 81.04 | 525.9 | 3.139 | 0 | 0 | 0 | 0 | 0 | | |
| 9:23 | 82.62 | 522.8 | 3.137 | 0 | 0 | 0 | 0 | 0 | | |
| 9:24 | 84.2 | 518.8 | 3.136 | 0 | 0 | 0 | 0 | 0 | | |
| 9:24 | 85.79 | 527 | 3.134 | 0 | 0 | 0 | 0 | 0 | | |
| 9:25 | 87.37 | 527.3 | 3.142 | 0 | 0 | 0 | 0 | 0 | | |
| 9:25 | 88.94 | 522 | 3.136 | 0 | 0 | 0 | 0 | 0 | | |
| 9:26 | 90.52 | 520.5 | 3.136 | 0 | 0 | 0 | 0 | 0 | | |
| 9:26 | 92.1 | 517.8 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:27 | 93.68 | 515.9 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:27 | 95.25 | 518.9 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:28 | 96.83 | 519.2 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:28 | 98.41 | 515.5 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:29 | 99.99 | 520.1 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:29 | 101.6 | 526.3 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:30 | 103.1 | 519.7 | 3.131 | 0 | 0 | 0 | 0 | 0 | | |
| 9:30 | 104.7 | 521.5 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:31 | 106.3 | 513.6 | 3.132 | 0 | 0 | 0 | 0 | 0 | | |
| 9:31 | 107.9 | 514.1 | 3.131 | 0 | 0 | 0 | 0 | 0 | | |
| 9:32 | 109.4 | 520 | 3.15 | 0 | 0 | 0 | 0 | 0 | | |
| 9:32 | 111.2 | 597.7 | 3.533 | 0 | 0 | 0 | 0 | 0 | | Start 3.5 bpm stage. |
| 9:33 | 113 | 594.4 | 3.531 | 0 | 0 | 0 | 0 | 0 | | |
| 9:33 | 114.7 | 592.2 | 3.532 | 0 | 0 | 0 | 0 | 0 | | |
| 9:34 | 116.5 | 592.7 | 3.532 | 0 | 0 | 0 | 0 | 0 | | |
| 9:34 | 118.3 | 594.8 | 3.532 | 0 | 0 | 0 | 0 | 0 | | |
| 9:35 | 120.1 | 595.3 | 3.542 | 0 | 0 | 0 | 0 | 0 | | |
| 9:35 | 121.9 | 591.6 | 3.54 | 0 | 0 | 0 | 0 | 0 | | |
| 9:36 | 123.6 | 594.1 | 3.534 | 0 | 0 | 0 | 0 | 0 | | |
| 9:36 | 125.4 | 594.6 | 3.534 | 0 | 0 | 0 | 0 | 0 | | |
| 9:37 | 127.2 | 592.8 | 3.542 | 0 | 0 | 0 | 0 | 0 | | |
| 9:37 | 129 | 598 | 3.542 | 0 | 0 | 0 | 0 | 0 | | |
| 9:38 | 130.8 | 599.2 | 3.543 | 0 | 0 | 0 | 0 | 0 | | |
| 9:38 | 132.6 | 593.5 | 3.543 | 0 | 0 | 0 | 0 | 0 | | |
| 9:39 | 134.3 | 588.7 | 3.544 | 0 | 0 | 0 | 0 | 0 | | |
| 9:39 | 136.1 | 596.6 | 3.536 | 0 | 0 | 0 | 0 | 0 | | |
| 9:40 | 137.9 | 591.1 | 3.544 | 0 | 0 | 0 | 0 | 0 | | |
| 9:40 | 139.7 | 590.3 | 3.545 | 0 | 0 | 0 | 0 | 0 | | |
| 9:41 | 141.5 | 590.8 | 3.547 | 0 | 0 | 0 | 0 | 0 | | |
| 9:41 | 143.3 | 587.8 | 3.546 | 0 | 0 | 0 | 0 | 0 | | |
| 9:42 | 145.1 | 630.9 | 3.721 | 0 | 0 | 0 | 0 | 0 | | |
| 9:42 | 147.1 | 701.4 | 4.072 | 0 | 0 | 0 | 0 | 0 | | Start 4 bpm stage. |
| 9:43 | 149.1 | 698.1 | 4.062 | 0 | 0 | 0 | 0 | 0 | | |

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| Well | | | Field | | | Service Data | | Customer | | Job Number |
|------------------|---------|-------------|---------------|---|---|--------------|---|---------------------|---|----------------------------------|
| FEDERAL SWD #F-2 | | | HELPER | | | | | DARKO PETROLEUM COM | | 20116221 |
| Time | Control | Pressure U1 | Test Pressure | | | | | | | Message |
| 24 hr clock | psi | psi | Rate bpm | | | | | | | |
| 9:43 | 151.2 | 694.4 | 4.057 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:44 | 153.2 | 713 | 4.072 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:44 | 155.3 | 704.6 | 4.063 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:45 | 157.3 | 701 | 4.063 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:45 | 159.4 | 699.6 | 4.072 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:46 | 161.4 | 697.1 | 4.064 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:46 | 163.5 | 696.6 | 4.073 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:47 | 165.5 | 698 | 4.065 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:47 | 167.6 | 697.6 | 4.074 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:48 | 169.6 | 696.2 | 4.069 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:48 | 171.7 | 696.6 | 4.066 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:49 | 173.7 | 693.9 | 4.074 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:49 | 175.6 | 693.4 | 4.067 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:50 | 177.6 | 694.7 | 4.076 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:50 | 179.9 | 690.5 | 4.065 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:51 | 181.9 | 685.4 | 4.075 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:51 | 184 | 685.4 | 4.075 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:52 | 186.1 | 763.2 | 4.482 | 0 | 0 | 0 | 0 | 0 | 0 | Start 4.5 bpm stage. |
| 9:52 | 188.4 | 811.3 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:53 | 190.7 | 810 | 4.565 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:53 | 192.9 | 813 | 4.565 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:54 | 195.2 | 811.6 | 4.574 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:54 | 197.5 | 808.9 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:55 | 199.8 | 814.2 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:55 | 202.1 | 809.2 | 4.565 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:56 | 204.4 | 802.3 | 4.571 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:56 | 206.7 | 812 | 4.571 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:57 | 209 | 801.9 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:57 | 211.3 | 807 | 4.565 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:58 | 213.6 | 804 | 4.574 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:58 | 215.9 | 808.9 | 4.572 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:59 | 218.2 | 814.4 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 9:59 | 220.5 | 810.9 | 4.563 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:00 | 222.8 | 794.4 | 4.566 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:00 | 225.1 | 800.6 | 4.571 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:01 | 227.4 | 807 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:01 | 229.7 | 808 | 4.564 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:02 | 231.2 | 815.8 | 3.714 | 0 | 0 | 0 | 0 | 0 | 0 | Start 6 bpm stage. |
| 10:02 | 231.3 | 774.4 | 2.769 | 0 | 0 | 0 | 0 | 0 | 0 | Not reading rate from frac pump. |
| 10:03 | 231.4 | 669.4 | 3.135 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:03 | 231.6 | 942.1 | 3.072 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:04 | 231.8 | 929.5 | 3.067 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:04 | 231.9 | 915.7 | 3.048 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:05 | 231.9 | 944.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:05 | 232.1 | 929.4 | 3.078 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:06 | 232.2 | 922.1 | 3.063 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:06 | 232.4 | 921.5 | 3.079 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:07 | 232.5 | 898.8 | 3.066 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:07 | 232.7 | 870.2 | 3.065 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:08 | 232.8 | 837.9 | 3.066 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:08 | 233 | 852.2 | 3.065 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:09 | 233.1 | 773.1 | 3.078 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:09 | 233.3 | 931.7 | 3.06 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10:10 | 233.4 | 954.9 | 3.062 | 0 | 0 | 0 | 0 | 0 | 0 | |

there what is it reading?

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| FEDERAL SWD #F-2 | | | | HELPER | | Service Date | | Customer | | Job Number |
|------------------|---------|----------------|----------------|--------|---|--------------|---|---------------------|----------------------------|------------|
| Time | Control | Pressure (psi) | Flowrate (bpm) | | | | | DARKO PETROLEUM COM | | 20118221 |
| 24 hr clock | psi | psi | bpm | | | | | | Message | |
| 10:10 | 233.8 | 952.9 | .3084 | 0 | 0 | 0 | 0 | 0 | | |
| 10:11 | 233.8 | 954 | .3086 | 0 | 0 | 0 | 0 | 0 | | |
| 10:11 | 233.9 | 934.2 | .3081 | 0 | 0 | 0 | 0 | 0 | | |
| 10:12 | 234.1 | 937.9 | .3081 | 0 | 0 | 0 | 0 | 0 | | |
| 10:12 | 234.2 | 942.2 | .308 | 0 | 0 | 0 | 0 | 0 | | |
| 10:13 | 234.4 | 928.8 | .3072 | 0 | 0 | 0 | 0 | 0 | | |
| 10:13 | 234.6 | 228.5 | 0 | 0 | 0 | 0 | 0 | 0 | End 5 bpm stage. | |
| 10:14 | 234.5 | 204 | 0 | 0 | 0 | 0 | 0 | 0 | Shut down, wait on water. | |
| 10:14 | 234.5 | 188.6 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:15 | 234.5 | 178.8 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:16 | 234.5 | 169.6 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:16 | 234.5 | 161.7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:17 | 234.5 | 155.7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:17 | 234.5 | 147 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:18 | 234.5 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:18 | 234.5 | 133.9 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:19 | 234.5 | 128.3 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:19 | 234.5 | 123.7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:20 | 234.6 | 116 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:20 | 234.5 | 110.4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:21 | 234.5 | 105.4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:21 | 234.5 | 100.8 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:22 | 234.5 | 96.16 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:22 | 234.5 | 91.58 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:23 | 234.5 | 84.96 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:23 | 234.5 | 794.3 | .2829 | 0 | 0 | 0 | 0 | 0 | Start 6 bpm stage. | |
| 10:24 | 234.7 | 1231 | .3718 | 0 | 0 | 0 | 0 | 0 | | |
| 10:24 | 234.9 | 1249 | .3722 | 0 | 0 | 0 | 0 | 0 | | |
| 10:25 | 235.1 | 1247 | .3723 | 0 | 0 | 0 | 0 | 0 | | |
| 10:25 | 235.2 | 1208 | .3656 | 0 | 0 | 0 | 0 | 0 | | |
| 10:26 | 235.4 | 1226 | .3688 | 0 | 0 | 0 | 0 | 0 | | |
| 10:26 | 235.6 | 1236 | .3682 | 0 | 0 | 0 | 0 | 0 | | |
| 10:27 | 235.8 | 1258 | .3714 | 0 | 0 | 0 | 0 | 0 | | |
| 10:27 | 236 | 1250 | .3717 | 0 | 0 | 0 | 0 | 0 | | |
| 10:28 | 236.2 | 1237 | .371 | 0 | 0 | 0 | 0 | 0 | | |
| 10:28 | 236.4 | 1252 | .3685 | 0 | 0 | 0 | 0 | 0 | | |
| 10:29 | 236.5 | 1257 | .3703 | 0 | 0 | 0 | 0 | 0 | | |
| 10:29 | 236.7 | 1269 | .3703 | 0 | 0 | 0 | 0 | 0 | | |
| 10:30 | 236.9 | 1280 | .3685 | 0 | 0 | 0 | 0 | 0 | | |
| 10:30 | 237.1 | 1256 | .371 | 0 | 0 | 0 | 0 | 0 | | |
| 10:31 | 237.3 | 1263 | .3703 | 0 | 0 | 0 | 0 | 0 | | |
| 10:31 | 237.5 | 1259 | .3704 | 0 | 0 | 0 | 0 | 0 | | |
| 10:32 | 237.7 | 1275 | .3702 | 0 | 0 | 0 | 0 | 0 | | |
| 10:32 | 237.8 | 1282 | .3702 | 0 | 0 | 0 | 0 | 0 | | |
| 10:33 | 238 | 752.3 | .2481 | 0 | 0 | 0 | 0 | 0 | | |
| 10:33 | 238.1 | 232.4 | 0 | 0 | 0 | 0 | 0 | 0 | Shut down, 6 bpm complete. | |
| 10:34 | 238.1 | 221.9 | 0 | 0 | 0 | 0 | 0 | 0 | ISIP 230 psi. | |
| 10:34 | 238.1 | 210.2 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:35 | 238.1 | 202.4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:35 | 238.1 | 196.9 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:36 | 238.1 | 187.9 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:36 | 238.1 | 183.2 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:37 | 238.1 | 174.5 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:37 | 238.1 | 169.5 | 0 | 0 | 0 | 0 | 0 | 0 | | |

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| Well | | | Field | | | Service Date | | Customer | | Job Number | |
|------------------|----------|----------------|--------------|---|---|--------------|---|---------------------|---|--------------------|--|
| FEDERAL SWD #F-2 | | | HELPER | | | | | DARKO PETROLEUM COM | | 20119221 | |
| Time | Quantity | Pressure (psi) | Total Volume | | | | | | | Message | |
| 24 hr clock | bbl | psi | sqm | | | | | | | | |
| 10:38 | 238.1 | 164.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:38 | 238.1 | 160.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:39 | 238.1 | 151.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 minute 160 psi. | |
| 10:39 | 238.1 | 148.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:40 | 238.1 | 142 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:40 | 238.1 | 137.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:41 | 238.1 | 132.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:41 | 238.1 | 128.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:42 | 238.1 | 123.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:42 | 238.1 | 119.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:43 | 238.1 | 114.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:43 | 238.1 | 109.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 minute 110 psi. | |
| 10:44 | 238.1 | 105.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:44 | 238.1 | 105.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:45 | 238.1 | 100.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:45 | 238.1 | 98.47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:46 | 238.1 | 93.44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:46 | 238.1 | 91.58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:47 | 238.1 | 87.03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:47 | 238.1 | 82.57 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:48 | 238.1 | 78.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:48 | 238.1 | 77.84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:49 | 238.1 | 73.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 minute 73 psi. | |
| 10:49 | 238.1 | 68.93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Job complete. | |
| 10:50 | 238.1 | 66.68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:50 | 238.1 | 64.11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10:51 | 238.1 | 59.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| Post Job Summary | | | | | | | | | |
|------------------------------|----|-----|--------------|--|-------------------------------|------|-----|-----|----------|
| Average Injection Rates, bpm | | | | | Volume of Fluid Injected, bbl | | | | |
| Field | W2 | OO2 | Maximum Rate | | Open Field | Acid | Oil | OO2 | W2 (ccf) |
| 4 | 0 | 0 | 6 | | 340 | 0 | 0 | 0 | 0 |

| Treating Pressure Summary, psi | | | | | | Quantity of & placed, lb | |
|--------------------------------|---------|-------|---------|--------------|----|--------------------------|------------------------|
| Breakdown | Maximum | Final | Average | 15 Min. 150' | | Total Injected | Total Ordered/Designed |
| 0 | 1275 | 1270 | 600 | 230 | 73 | 0 | 0 |

| W2 Percent | OO2 Percent | Designed Fluid Volume | Displacement | Slurry Volume | Pad Volume | Percent Pad |
|------------|-------------|-----------------------|--------------|---------------|------------|-------------|
| 0% | 0% | 14000 gal | 0 bbl | 340 bbl | 0 gal | 0 % |

| Customer or Authorized Representative | Dowell Supervisor | Number of Stages | Fracture Gradient | Job Completed |
|---------------------------------------|-------------------|------------------|-------------------|--|
| Dick Dietz | Selwyn Simper | 0 | 0.46 psi/ft | <input checked="" type="checkbox"/> Job Completed <input type="checkbox"/> Screen Out |

789-0411

Gary Dimmick

Marty Hiatt



November 24, 1997

Anadarko Petroleum Corporation
17001 Northchase Drive
P.O. Box 1330
Houston, TX 77251-1330

ATTN: Mr. Shad Frazier

Subject: Hydrogeologic Assessment in the Vicinity of Anadarko
Ferron Coalbed Methane Water-Disposal Well Helper State SWD # 1

Dear Mr. Frazier:

This letter-report is a summary of findings of an evaluation of general groundwater quality and hydrogeologic conditions in the vicinity of the Anadarko North Area Ferron Coalbed Methane project in Carbon County, Utah.

Project Background and Scope

It is our understanding that Anadarko has completed water-disposal well Helper State SWD #1 at 1,131' FSL, 2,194' FWL of Section 3, Township 14 South, Range 10 East, in Carbon County, Utah. The well was drilled to a depth of 6,488 feet, and is completed in the Navajo Sandstone and Wingate Sandstone. The well will be used to dispose of water removed from nearby existing and proposed coalbed methane production wells completed in the Ferron Sandstone at depths of approximately 2,100 feet.

The purpose of this report is to provide Anadarko with an independent evaluation of hydrogeologic conditions in the area of the disposal well, specifically those in the Navajo Sandstone Aquifer. The scope of our services included the collection and analysis of available information for permitted water-supply and oil and gas wells within a five-mile radius of the disposal well site, and review and interpretation of available geologic maps and reports for the area. Data sources included:

- Utah Department of Natural Resources Division of Water Rights database, files, and reports
- Utah Department of Natural Resources Division of Water Resources reports
- Utah Division of Oil, Gas and Mining (UDOGM) files
- Utah Geological Survey reports and maps
- U.S. Geological Survey (USGS) database, reports, and maps

Geology of the Navajo Sandstone

The Lower Jurassic Navajo Sandstone is a light-brown to light-gray, thick-bedded to massive, cross-bedded quartzose sandstone. The Navajo is generally fine-grained, clean and friable. The formation contains a few thin lenticular, light-gray limestone beds in the upper part (Witkind, 1995). Navajo exposures range from steep cliffs to rounded knolls and nearly flat terrain. The Navajo Sandstone ranges in thickness from 400 to 1,000 feet along the west flank of the San Rafael Swell, and is projected to be approximately 300 feet thick in the vicinity of Helper State SWD #1 (Hood and Patterson, 1984, Plate 6; attached Figure 1). In the vicinity of Helper, the Navajo Sandstone strikes generally northeast and dips from 3 to 7 degrees west (Witkind, 1988).

Groundwater Occurrence

SWD #1 4300730361 T14S, R10E S.3 6489TD

Groundwater in the area north of the San Rafael Swell occurs under confined, unconfined, and perched conditions. Most water in the unconsolidated surficial deposits is unconfined and saline, due to dissolution of evaporite minerals. Perched conditions occur in partially or fully-saturated strata underlain by less-permeable, unsaturated rocks. Water in consolidated strata such as the Navajo Sandstone is unconfined in and near outcrops around the perimeter of the Swell, where recharge to the aquifer occurs (see attached Figure 2). Downgradient and downdip from the recharge areas, the water level in the confined aquifer intersects the contact with an overlying confining layer, and groundwater is under confined conditions. In the San Rafael Swell, the Carmel Formation serves as the confining layer above the Navajo Sandstone.

Groundwater Movement

According to information extrapolated from Hood and Patterson (1984, Plate 5) the potentiometric surface of groundwater in the Navajo Sandstone is approximately 5,100 feet above mean sea level (about 900 feet below ground level) in the vicinity of Helper State SWD #1 (see Figure 2). Groundwater in the Navajo Sandstone is recharged by infiltration into exposures of the formation around the flanks of the San Rafael Swell. Recharge along the west flank flows downdip (westerly) toward Castle Valley (Figure 2). Approximately 20 miles south of Castle Dale, the west-flank groundwater flow in the Navajo splits into north and south components (Hood and Patterson, 1984, Plate 5; Weiss, 1987, Figure 7). The direction of groundwater movement in the Navajo north of the groundwater divide (in the area of Castle Dale) is north-northeast; in the area of Price and Helper groundwater flows east-northeast. Groundwater flow in the Navajo continues clockwise around the north end of the San Rafael Swell, and generally southwest along the east flank of the Swell, until it intercepts and discharges to the Green River.

Based on analysis of shallow (less than 5 feet in depth) bedrock cores and outcrop samples, the porosity of the Navajo Sandstone in the northern San Rafael Swell area ranges

from 3.6 to 26.8 percent (averaging 17.7 percent), and hydraulic conductivities range from 0.0037 to 5.1 feet per day (Hood and Patterson, 1984). As extrapolated from Hood and Patterson's potentiometric contour map (1984, Plate 5; attached Figure 2), the hydraulic gradient of groundwater in the Navajo near Helper is easterly, at 0.0013.

The horizontal rate of groundwater flow (or average linear velocity) can be calculated using a modified form of the Darcy Equation (Freeze and Cherry, 1979):

$$v = (K/n) (dh/dl)$$

where:

| | | |
|-------|---|--|
| v | = | average linear velocity (feet per day) |
| K | = | hydraulic conductivity (feet per day) |
| n | = | porosity (fraction) |
| dh/dl | = | hydraulic gradient (feet/foot) |

Using the published range of values for K and n and the calculated dh/dl discussed above, the calculated average linear velocity of groundwater in the Navajo Sandstone in the northern San Rafael area may range from 0.007 feet per year (under low conductivity, high porosity conditions) to 67 feet per year (under high conductivity, low porosity conditions). Note that these velocities are not based on site-specific data, but are calculated using hydraulic characteristics of near-surface, weathered samples. It is probable that the velocity of groundwater flow in the formation as a whole, and particularly in the unweathered formation at depth, is more in line with the lower velocity.

Near Caineville (approximately 95 miles due south of Helper), cores of Navajo Sandstone from 1,000 to 2,000 feet below ground surface had an average horizontal hydraulic conductivity (K) of 0.5 feet per day (Hood and Danielson, 1979, pg. 36). Assuming that the K value of these cores is more representative of the hydraulic conductivity of the Navajo at depth in the Castle Dale area, and assuming the 17.7 percent average porosity and 0.0013 hydraulic gradient extrapolated from Hood and Patterson (1984), an average linear velocity of 1.34 feet per year is derived.

Groundwater Use

Deep-source groundwater use in Carbon County is very limited. A review of recorded water rights for the 120 sections within an approximate 5-mile radius of Helper State SWD #1 revealed a total of 675 water rights. Of these, 633 are surface rights on creeks and springs, and 42 are underground water rights for wells. Of the 42 underground water rights, only 10 have Well Driller Reports on file with the Utah Division of Water Rights. Nine of these wells are less than 200 feet deep; the remaining well was drilled by Mountain Fuel Supply to 958 feet and produced brackish water. According to the Utah Division of

Water Rights regional engineer, no water is currently withdrawn from the Navajo Sandstone in Carbon County, and communities rely on surface water and spring flow collected from the Price River and the Wasatch Plateau.

Five test wells were installed in 1981 by Utah Power and Light (UP&L) in Section 1, Township 20 South, Range 9 East and Section 7, Township 20 South, Range 10 East (35 miles south of Helper State SWD #1, see Figure 2). The wells were drilled to the top of the Kayenta Formation and completed in the Navajo at depths ranging from 575 to 882 feet. Navajo thickness ranged from 340 to 404 feet. Although the wells produced water of sufficient quality and quantity for use in UP&L's power plant near Castle Dale, the cost of a conveyance pipeline was determined to be prohibitive, and adequate surface water supplies were available. The wells were donated by UP&L to the Utah Division of Wildlife Resources.

Groundwater Quality

In general, groundwater is saline in much of the northern San Rafael Swell area. Most formations in the Swell contain fresh water only near the recharge areas. Fresh water occurs in the Navajo Sandstone near outcrop areas on the perimeter of the Swell where infiltration of meteoric water flushes out dissolved solids. In most other areas of the northern San Rafael Swell, with increasing distance from recharge areas, water in the Navajo shows degradation by interformational leakage and mixing with saline water from adjacent formations (e.g., the overlying Carmel Formation) which contain gypsum, halite, and other evaporite minerals (Hood and Patterson, 1984).

Water samples collected by UP&L from the Navajo at various depths in the above-mentioned wells were submitted for laboratory analyses of water quality. The analytical results indicate total dissolved solids (TDS) concentrations from 600 to 6,799 milligrams per liter (mg/l). These wells are only 1.5 miles downdip from numerous narrow canyon-bottom exposures of the Navajo, and only 3 miles downdip of broad Navajo exposures with little relief. The relative "freshness" of some of the samples of Navajo groundwater from the UP&L wells is a function of shallow depth and the proximity of the wells to this recharge area.

The salinity of groundwater typically increases with depth of burial and distance from the area of recharge (Freeze and Cherry, 1979, pg. 241-243). This degradation in quality is primarily related to the distance the groundwater has traveled (allowing more time for dissolution of minerals in the formation). Because of this, it is reasonable to expect that water quality in the Navajo Sandstone degrades westward and northward with increasing depth and distance from the outcrop; the Navajo at Helper State SWD #1 is under 6,000 feet of cover and is more than 30 miles downgradient from the nearest recharge area.

According to information on file with the Utah Division of Oil, Gas and Mining, the TDS concentration of groundwater collected from the Navajo Sandstone at the River Gas Corporation Drunkard's Wash injection well D-1 (immediately southwest of Price, Utah) was analyzed at 172,386 milligrams per liter (parts per million [ppm]), which is an extremely saline brine. The Navajo Sandstone at well D-1 is under approximately 5,700 feet of cover, and is about 28 miles north-northwest of the nearest outcrop (recharge area) of the Navajo in the San Rafael Swell. The TDS concentration of water removed from the Ferron Sandstone coal beds at Drunkard's Wash and injected in the Navajo Sandstone at well D-1 is approximately 15,000 ppm; thus, injection of Ferron water actually decreases the salinity of groundwater in the Navajo.

Helper State SWD #1 is perforated across three depth intervals: from 5,920 feet to 6,090 feet and from 6,112 to 6,154 feet (in the Navajo Sandstone); and from 6,256 to 6,320 feet (in the Wingate Sandstone). For the purposes of this report, groundwater in the Wingate Sandstone is not differentiated from that in the Navajo Sandstone Aquifer (i.e., both formations and the interposed Kayenta Formation are considered a single hydrogeologic unit). Groundwater collected from these three zones between November 7 and 12, 1997 contained TDS concentrations of 64,997 ppm, 86,022 ppm, and 107,809 ppm, respectively. A composite sample of water from Anadarko's Ferron Sandstone production wells collected on November 12, 1997 had a TDS concentration of 25,500 ppm. As compared with conditions at Drunkard's Wash, the Navajo groundwater is less saline and the Ferron groundwater is more saline in the vicinity of the Anadarko wells. As at Drunkard's Wash, however, because the Ferron groundwater is more "fresh" than the Navajo groundwater, injection of the produced Ferron water in Helper State SWD #1 will decrease the salinity of water in the Navajo.

Potential Effects of Water-Disposal on Water Quality in the Navajo Aquifer

The effect of Ferron Sandstone groundwater disposal on water quality in the Navajo Sandstone Aquifer in the vicinity of Helper State SWD #1 will depend primarily on the quality of water removed from the Ferron during dewatering and gas production, and the quality of groundwater in the Navajo prior to injection of the Ferron water. Analyses of the Ferron and Navajo groundwaters suggest that injection of saline water from the Ferron may actually improve groundwater quality in the Navajo.

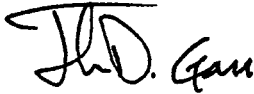
Hood and Patterson (1984, pg. 40) note that the relatively low transmissivity of the Navajo Sandstone results in a restricted cone of depression and steep drawdown under pumping. Because groundwater injection and groundwater withdrawal in confined aquifers have equivalent but inverse effects on the potentiometric surface surrounding the injection or withdrawal point (Freeze and Cherry, 1979, pg. 454), it is reasonable to expect that injection will result in a high, but relatively restricted groundwater mound in the Navajo Sandstone. Considering the upgradient distance to fresher, more usable water in the Navajo (closer to the formation's recharge area 30 miles southeast of Helper State SWD

#1), it is unlikely that injection of Ferron groundwater could adversely affect groundwater quality in the vicinity of future potential water-production sites.

It has been a pleasure to work with you on this project. If you have any questions or require additional information or services, please do not hesitate to call me at (801) 273-2416.

Sincerely,

MONTGOMERY WATSON

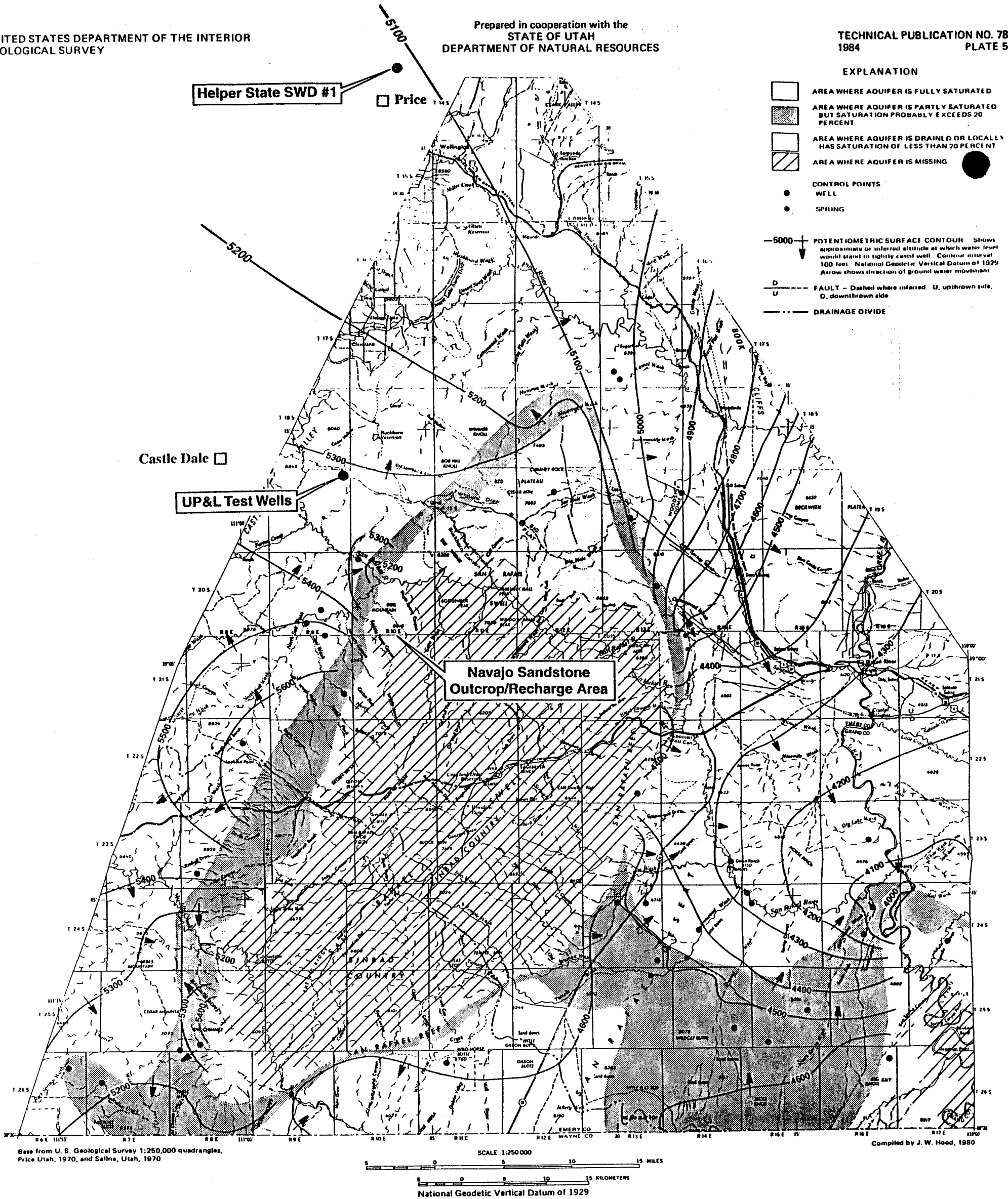
A handwritten signature in black ink, appearing to read "John D. Garr". The signature is stylized with a large, sweeping initial "J" and "D".

John D. Garr, R.G.
Supervising Hydrogeologist

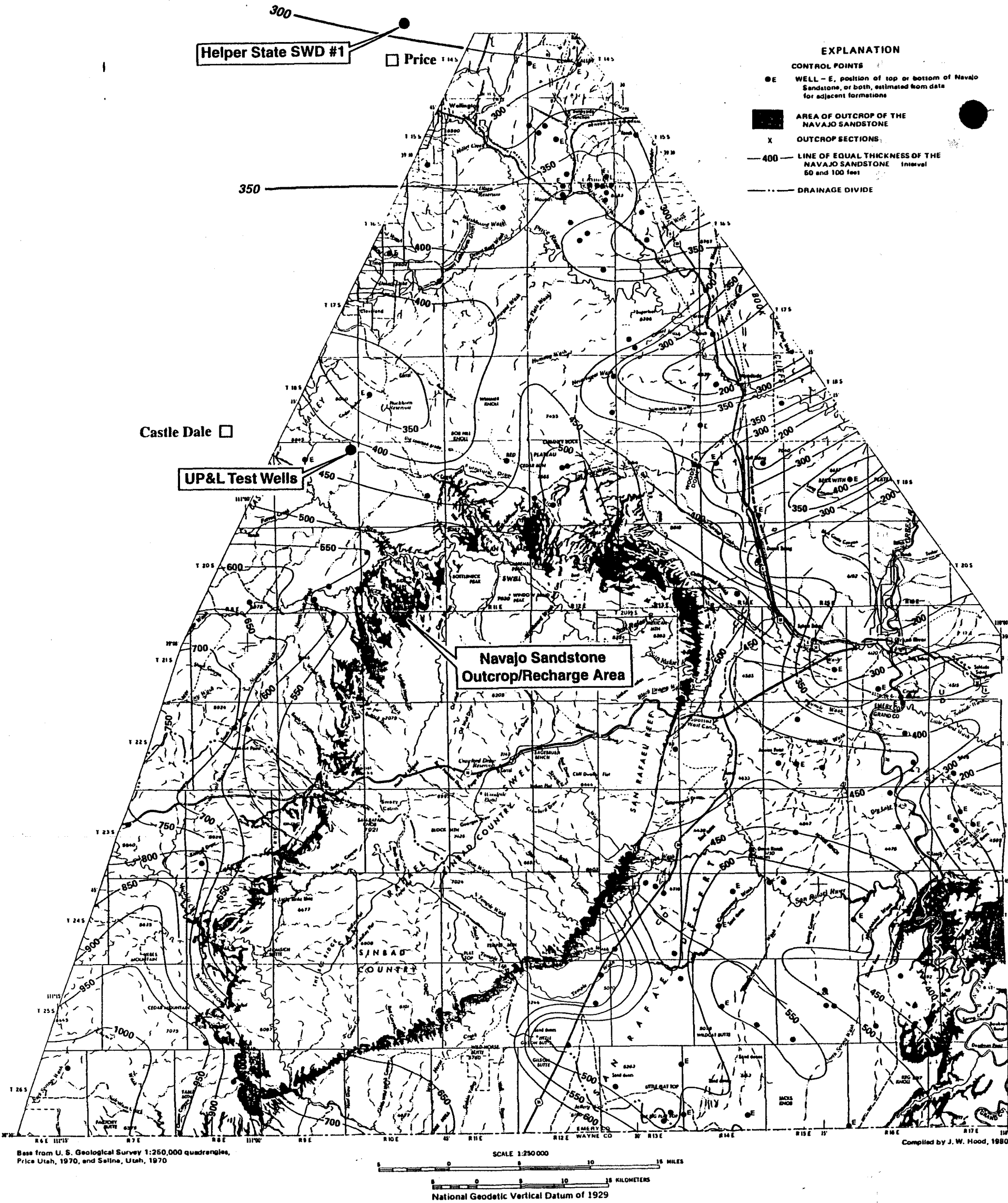
Attachments: Figure 1
Figure 2

REFERENCES CITED

- Freeze, R.A., and Cherry, J.A., 1979. Groundwater: Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 604 p.
- Hood, J.W., and Danielson, T.W., 1979. Aquifer tests of the Navajo Sandstone near Caineville, Wayne County, Utah: State of Utah Department of Natural Resources Division of Water Rights Technical Publication No. 66, 69 p.
- Hood, J.W., and Patterson, D.J., 1984. Bedrock aquifers in the northern San Rafael Swell area, Utah, with special emphasis on the Navajo Sandstone: State of Utah Department of Natural Resources Division of Water Rights Technical Publication No. 78, 128 p. text, 5 plates.
- Weiss, E., 1987. Groundwater flow in the Navajo Sandstone in parts of Carbon, Grand, Carbon, Wayne, Garfield, and Kane counties, southeast Utah: U.S. Geological Survey Water-Resources Investigations Report 86-4012, 41 p.
- Witkind, I.J., 1988. Geologic map of the Huntington 30' x 60' quadrangle, Carbon, Carbon, Grand, and Uintah Counties, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-1764. 1:100,000-scale.
- Witkind, I. J., 1995. Geologic map of the Price 1_ x 2_ quadrangle, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-2462. 1:250,000-scale.



MAP SHOWING THE APPROXIMATE POTENTIOMETRIC SURFACE FOR THE NAVAJO SANDSTONE AQUIFER IN THE NORTHERN SAN RAFAEL SWELL AREA, UTAH.
FIGURE 2



MAP SHOWING THICKNESS OF THE NAVAJO SANDSTONE IN THE NORTHERN SAN RAFAEL SWELL AREA, UTAH.
FIGURE 1

**ADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.**

CONFIDENTIAL

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

08/03/1999 PBTB 6165 (NAVAJO) TIH W/ 33 JTS, TAG 6104', DO CMT FROM 6104-6165, CIRC HOLE WITH 2% KCL, POOH W/ TBG, CC 427,420.

08/04/1999 PBTB 6165 (NAVAJO) RIH W/ 4.63" GR TO 6163, RAN GR/CBL/CCL, TOC 2108, PRESS CSG TO 4000 - OK, **PERF 6143-55, 6072-6116 (NAVAJO)** W/ 4 SPF, 22.7 GRM, 0.37" DIAM, 90 DEG PH, TIH W/ PKR & 189 JTS TBG, SET PKR @ 6038, SDFN, CC 437,200.

08/05/1999 PBTB 6165 (NAVAJO) MIRU SU, SWAB 58 BW, RD SU, POOH W/ TBG AND PKR, RU WL, SET RBP @ 6040, FILL CASING W/ 2% KCL, PRESSURE TEST RBP TO 1000 PSI-OK, DMP BAIL 2 SKS SAND ON RBP, SDFN CC 440,100.

08/06/1999 PBTB 6165 (NAVAJO) MIRUWL, **PERF 5958-98, 5838-5950**, RDMOWL, RIH W/ PKR AND TBG, SET PKR @ 5815, RUSU, SWAB 79 BW, SDFN, CC 451,600.

08/07/1999 PBTB 6165 (NAVAJO) SWAB WELL, CAUGHT FL SAMPLE, REL PKR, POOH, RU WL, TIH W/ RBP SET @ 5830, TEST RBP TO 1000-OK, SDFN, CC 453,950.

08/08/1999 PBTB 6165 (NAVAJO), RUWL, **PERF NAVAJO, 5720-5820, 5649-5710**, RDMOWL, TIH W/ PKR AND TBG, SET PKR @ 5594, RU SWAB, SWAB 78 BW, SDFN, CC 465,900.

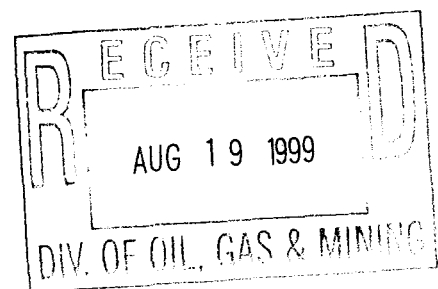
08/09/1999 PBTB 6165 (NAVAJO), SI, CC 465,900.

08/10/1999 PBTB 6165 (NAVAJO), SWAB 10 RUNS, REL PKR, POOH W/ PKR, TIH W/ TBG, TAG RBP @ 5830, CIRC SAND AND RETR RBP, POOH W/ RBP, TIH W/ TBG AND RETR HEAD, LEFT AT 5594, SIWFN, CC 472,500.

08/11/1999 PBTB 6165 (NAVAJO), TIH W/ TBG, TAG RBP @ 5998, CIRC CLEAN, LATCH RBP, POOH W/ RBP, TIH W/ TBG AND PKR, SET PKR @ 5594, RU PMP TRK BD W/ 10,500 GALS OF 2% KCl, AIR 8.2 BPM @ 2090, ISIP 215, CC 475,100.

08/12/1999 PBTB 6165 (NAVAJO), STEP RATE TEST, PMPD 339 BW, REL PKR, POOH LD TBG, NDBOPE, NUWH, SWI, RDMOPU. CC 484,200.

08/13/1999 NO REPORT. - **TEMP DROP FROM REPORT** -



**ANADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.**

CONFIDENTIAL

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

07/07/1999 MIRU - SET 20" CONDUCTOR @ 13', GROUT SAME, SPUD @ 0800 HRS 06 JULY 1999, DRLG F/ 13-320 W/ HAMMER BIT, POOH, RIH W/ 7 JTS 13-3/8" 48# CSG, SET CSG @ 317, CMT W/ 340 SX @ 15.6 PPG, CIRC 32 BBLS CMT, LAST SURVEY @ N/A, MW 8.6 PPG, CC 65,000. RPT #1

07/08/1999 WOC, CUT CSG, NU BOPE, TEST SAME, RIH, D/O CMT 277-320, AIR DRLG F/ 320-442, LAST SURVEY @ 400-0.5°, CC 86,890. RPT #2

07/09/1999 AIR DRLG F/ 442-1477, LAST SURVEY MISS RUN, CC 96,397. RPT #3

07/10/1999 AIR DRLG F/ 1477-2271, CCH @ 2154 & 2185, LAST SURV MISS RUN, CC 107,617. RPT #4

07/11/1999 AIR DRLG F/ 2271-2285, CC F/ LOGS, SHORT TRIP, POOH, RIH W/ LOGS - LOGS STOPPED @ 2080, R/D LOGGERS, MIX MUD, RIH W/ MULTISHOT, DISP W/ MUD, W&R F/ 2075-2180, LAST SURV @ 2121-4.65°, CC 122,003. RPT #5

07/12/1999 W&R F/ 2180-2285, CCM, SHORT TRIP, POOH, RIH W/ LOGS, LOG WELL, R/D LOGGERS, RIH, CCM, POOH, RIH W/ 8-5/8" 24# CSG, LAST SURV @ 2121-4.65°, CC 133,780. RPT #6

07/13/1999 RIH W/ 51 JTS 8-5/8" 24# CSG, WASH 10' TO BTM, SET CSG @ 2285, CCM, CMT W/ 755 SX LEAD @ 12.7 PPG & 250 SX TAIL @ 15.6 PPG, DISP, CIRC 70 BBL CMT TO SURF, BUMP PLUG, FLOATS DID NOT HOLD, SI & HELD PRESS 4 HRS, CUT CSG, INSTALL B SECTION, NU BOP, TEST BOP, RIH, LAST SURV @ 2121-4.65°, CC 184,487. RPT #7

07/14/1999 RIH, D/O CMT & FS, DRILL 10', FIT 10 PPG EMW, DRLG F/ 2295-2497, C&C TIGHT HOLE @ 2497, DRLG F/ 2497-2964, LAST SURV @ 2466-4.25°, CC 194,411. RPT #8

07/15/1999 DRLG F/ 2964-3334, TFB 3 @ 3334 - TIGHT HOLE, LAST SURV @ 3254-5.0°, CC 204,958. RPT #9

07/16/1999 TIH W/ BIT 3, W&R 2570-2664 & 2839-3210 & 3300-BTM, DRLG F/ 3334-3597, LAST SURVEY @ 3254-5.0°, CC 221,832. RPT #10

07/17/1999 DRLG F/ 3597-3954, LAST SURV @ 3570-5.25°, MW 9.0 PPG, CC 233,761. RPT #11

07/18/1999 DRLG F/ 3954-4226, TFB 5 @ 4226, LAST SURV @ 4151-4.75°, MW 9.1 PPG, CC 249,303. RPT #12

07/19/1999 DRLG F/ 4226-4422, TRIP F/ MTR @ 4408, LAST SURV @ 4333-5.0°, MW 9.1 PPG, CC 258,609. RPT #13

07/20/1999 DRLG F/ 4422-4800, LAST SURV @ 4333-5.0°, MW 9.0 PPG, CC 269,570. RPT #14

07/21/1999 DRLG F/ 4800,-5096, TFB 6 @ 5096, LAST SURV @ 5021-5.5°, MW 9.0 PPG, CC 279,982. RPT #15

07/22/1999 DRLG F/ 5096-5473, LAST SURV @ 5021-5.5°, MW 9.1 PPG, CC 295,041. RPT #16

07/23/1999 DRLG F/ 5473-5922, TFB 7 @ 5922, LAST SURV @ 5021-5.5°, MW 9.1 PPG, CC 306,854. RPT #17

07/24/1999 TIH, TOOHL, LD MTR & 1 DC, PU MTR, RIH, DRLG F/ 5922-5999, LOST CIRC, MIX & SPOT 20 BBL PILL, POOH 5 STANDS, MIX MUD & BUILD VOLUME, LAST SURV @ 5855-2.25°, MW 9.4 PPG, CC 323,688. RPT #18

07/25/1999 REGAIN CIRC, DRLG F/ 5999-6190, LOST CIRC, SPOT LCM PILL, DRLG F/ 6190-6200 (TD) W/ PARTIAL RETURNS, SPOT LCM PILL ON BTM, SHORT TRIP, CCM, POOH, LOG WELL, LOGGER TD 6197, LAST SURV @ 5855-2.25°, MW 9.1 PPG, CC 336,072. RPT #19

07/26/1999 FINISH LOGS, RIH, CCM, POOH LDDP, RIH W/ 144 JTS 5-1/2" 15.5 # K55 CSG, SET CSG @ 6200. CMT 1ST STAGE, OPEN DV TOOL, CCM FOR 2ND STAGE, LAST SURV @ 5855-2.25°, MW 9.1 PPG, CC 389,220. RPT #20

07/27/1999 CMT 2ND STAGE W/ 420 SX, BUMP PLUG, FLOATS HELD, ND BOP, SET SLIPS, CUT CSG, CLEAN PITS, RLS RIG @ 1200 HRS 26 JULY 1999, LAST SURV @ 5855-2.25°, MW 9.1 PPG, CC 414,408. RPT #21 - **TEMP DROP FROM REPORT** -

08/01/1999 PBTD 4970 (NAVAJO) MIRUPU, INSTALL TBG HEAD, TIH W/ 4 3/4" BIT AND TBG, SDFN, CC 418,350.

**ANADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.**

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

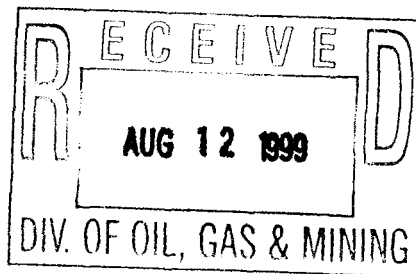
08/02/1999 PBTD 5022 (NAVAJO) TIH W/ TBG, TAG CMT @ 4970, DO 4970-5022 DO DV TOOL, TIH W/ ONE JT, SWI, SDFN, CC 422,550.

08/03/1999 PBTD 6165 (NAVAJO) TIH W/ 33 JTS, TAG 6104', DO CMT FROM 6104-6165, CIRC HOLE WITH 2% KCL, POOH W/ TBG, CC 427,420.

08/04/1999 PBTD 6165 (NAVAJO) RIH W/ 4.63" GR TO 6163, RAN GR/CBL/CCL, TOC 2108, PRESS CSG TO 4000 - OK, **PERF 6143-55, 6072-6116 (NAVAJO)** W/ 4 SPF, 22.7 GRM, 0.37" DIAM, 90 DEG PH, TIH W/ PKR & 189 JTS TBG, SET PKR @ 6038, SDFN, CC 437,200.

08/05/1999 PBTD 6165 (NAVAJO) MIRU SU, SWAB 58 BW, RD SU, POOH W/ TBG AND PKR, RU WL, SET RBP @ 6040, FILL CASING W/ 2% KCL, PRESSURE TEST RBP TO 1000 PSI-OK, DMP BAIL 2 SKS SAND ON RBP, SDFN CC 440,100.

08/06/1999 PBTD 6165 (NAVAJO) MIRUWL, **PERF 5958-98, 5838-5950**, RDMOWL, RIH W/ PKR AND TBG, SET PKR @ 5815, RUSU, SWAB 79 BW, SDFN, CC 451,600.



STATE OF UTAH
DIVISION OF OIL GAS AND MINING

CASING / CEMENTING OPERATIONS

| | |
|--|---------------------------------------|
| Well Name: FEDERAL F-2 SWD | API Number: 43-007-30555 |
| Qtr/Qtr: Section: 8 | Township: 14S Range: 10E |
| Company Name: ANADARKO | |
| Lease: State Fee | Federal UTU-65762 Indian |
| Inspector: DENNIS L. INGRAM | Date: 7/12/99 |

Casing Centralized: Yes X No Cementing Company: HALLIBURTON.

Casing was run and cemented according to the approval to drill, any changes are noted in the comments below.

COMMENTS: DRILLED 2285' OF 12 1/4" HOLE. LOGGER SAME AND RUN 24# 8 5/8"
INTERMEDIATE CASING TO BOTTOM. HALLIBURTON CEMENTED WITH A LEAD SLURRY
OF HALLIBURTON LITE @ 12.7 PPG. 1.85 YIELD. 9.82 GAL/SX AND TAIL WITH PREMIUM
PLUS 15.6 PPG. YIELD 1.18. @ 5.2 GAL/SX. THEY HAD CIRCULATION THROUGHOUT
CEMENT JOB AND BROUGHT APPR. 70 BARRELS OF CEMENT TO SURFACE.
LEAD CEMENTING WAS DONE WITH 755 SXS; TAIL CEMENTING WITH 250 SXS.

Attach copy of cement ticket if available.

REGION North America
 MBU ID / EMP # 122074
 LOCATION 0208
 TICKET AMOUNT

NWA/COUNTRY Rocky Mtn USA
 EMPLOYEE NAME
 COMPANY
 WELL TYPE

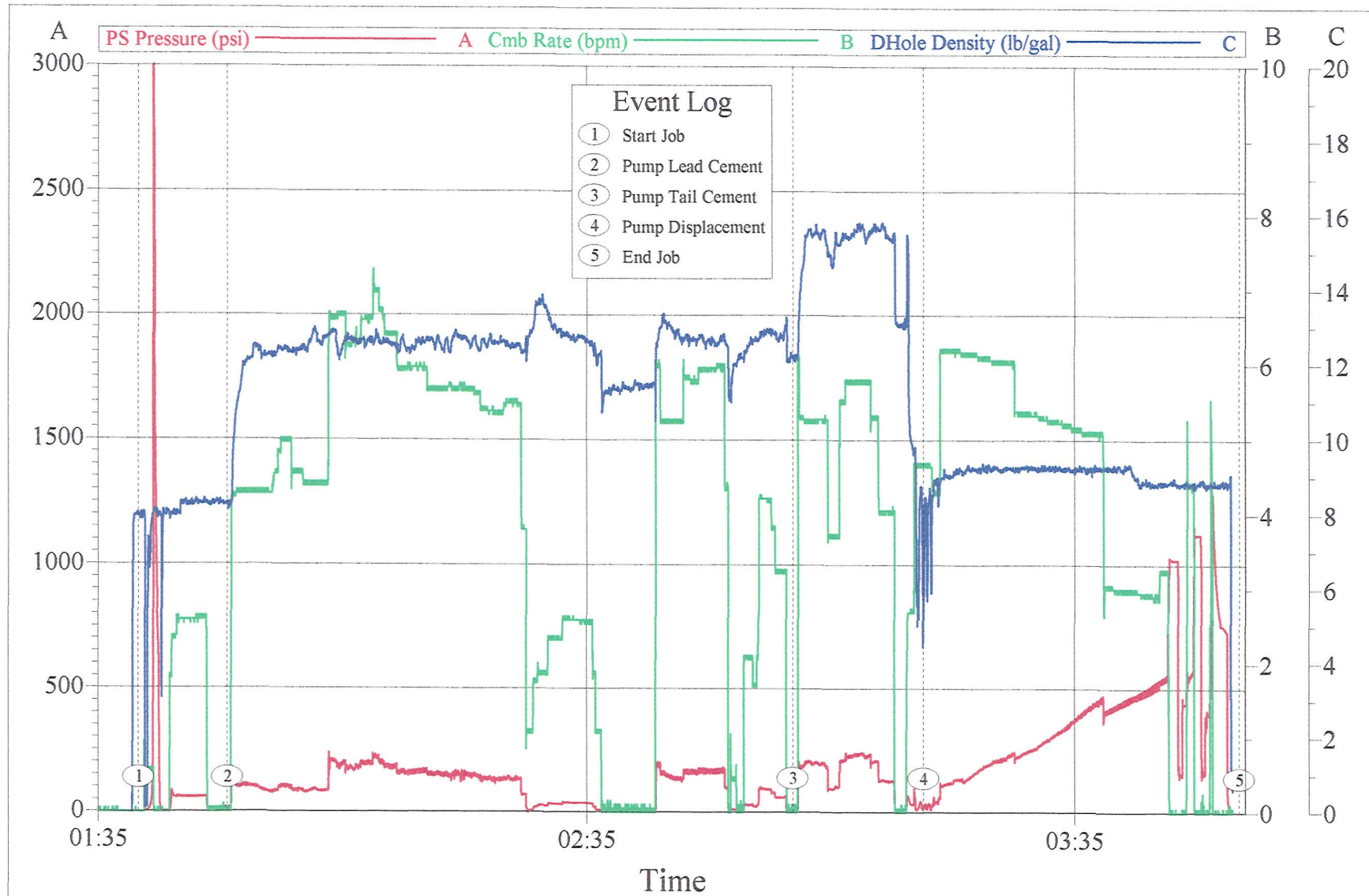
BDA / STATE UTAH
 PSL DEPARTMENT
 CUSTOMER REP / PHONE
 API / UWI #
 JOB PURPOSE CODE

WELL LOCATION
 LEASE / WELL #

DEPARTMENT
 SEC / TWP / RING

| HES EMP NAME/EMP#/(EXPOSURE HOURS) HRS | HES EMP NAME/EMP#/(EXPOSURE HOURS) HRS | HES EMP NAME/EMP#/(EXPOSURE HOURS) HRS | HES EMP NAME/EMP#/(EXPOSURE HOURS) HRS |
|--|--|--|--|
| C Cook 122074 | R Davis 122378 | | |
| G Parnell 121467 | | | |
| D Remond 121480 | | | |
| W Anderson 122234 | | | |

| CHART NO. | TIME | RATE (BPM) | VOLUME (BBL)(GAL) | PUMPS T C | PRESS. (psi) Tbg Csg | JOB DESCRIPTION / REMARKS |
|-----------|------|------------|-------------------|-----------|----------------------|---|
| | 1400 | | | | | 7-11-99 |
| | 1530 | | | | | Called out |
| | 1800 | | | | | Final safety meeting |
| | | | | | | on location spotgrip, riser |
| | | | | | | Safety meeting job procedures |
| | | | | | | 7-12-99 |
| | | | | | | 8 5/8 24" Lateral drill casing to 2285' |
| | | | | | | 12 1/4 hole |
| | 0140 | | | | 3000 | PSI TEST LINES |
| 0143 | 25 | 10 | | | 60 | Pump Fresh Alcohol |
| 0151 | 4.2 | 0 | | | 100 | Start Lead CMT 12.7# 1.85 FT ³ /SK 982 gal/SK |
| 0204 | 6.6 | 605 | | | 190 | Rate + PSI |
| 0220 | 5.6 | 145 | | | 145 | " |
| 0300 | | 250 | | | | and Lead CMT 7.55 SK |
| 0301 | 5.5 | 0 | | | 200 | Start Drill CMT 15.6# 1.18 FT ³ /SK 5.2 gal/SK |
| 0313 | 0 | 53 | | | 0 | and Drill CMT |
| 0314 | 4.6 | 0 | | | 35 | Drop plug |
| 0317 | | 10 | | | | Start down Fresh H ₂ O |
| 0317 | 6.1 | 0 | | | 110 | and Fresh |
| 0322 | 6.1 | 36 | | | 150 | Start mud displacement |
| 0329 | 5.3 | 75 | | | 250 | Caught CMT |
| 0338 | 3 | 120 | | | 450 | CMT to Surface |
| 0346 | 3 | 143 | | | 1000 | Slow rate |
| | 0 | | | | | Lead plug |
| 0349 | | | | | | Shut down |
| 0352 | | | | | 1200 | Check float - float disconnected |
| | | | | | | bring up PSI |
| | | | | | | Shut in CMT Head |
| | | | | | | and jobs. |
| | | | | | | 7/2 7060 CMT to Surface |
| | | | | | | Thanks |
| | | | | | | Bill & Halliburton Crew |



Customer: Anadarko Petroleum
Well Description: Helper Federal #F-2 SWD Stg Intermediate

Job Date: 12-JUL-1999
UWI:

Ticket #: 99960



CemWin v1.1.0
12-Jul-99 04:00



September 24, 1999

Mr. John Baza
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1220
Salt Lake City, UT 84114

**Reference: Helper Federal F-2 SWD
Section 8-T14S-R10E
Carbon County, Utah**

Dear Mr. Baza:

Attached you will find all the required documentation to complete our application for a Class II Injection Permit for the above referenced well.

Section 2.1 - Request for a plat showing the location of the injection well, all abandoned or active wells within a one-half mile radius of the proposed well, and the surface owner and the operator of any lands or producing leases, respectively, within a one-half mile radius of the proposed injection well. The plat is attached as several documents under Exhibit "A". The plat is associated with a listing of all the surface and mineral interest owners within the one-mile radius of the well.

Section 2.8 - Request for a maximum and average injection pressure. Anadarko requests that an average injection pressure for the referenced well be set at 1300 psig and that a maximum injection pressure be set at 1400 psig. These pressures correspond to the injection step rate test performed on the well. We were unable to see any pressure increase above friction pressure during the test. A pressure plat is attached as Exhibit "B".

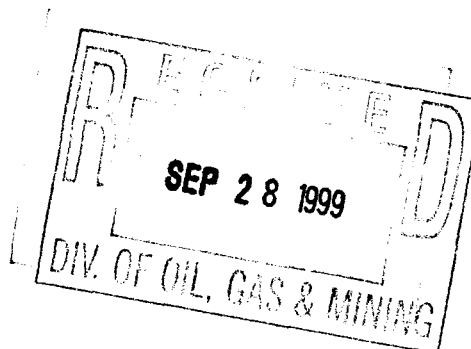
Section 2.9 & 2.10 - Require geological data. A cross-section of the disposal interval is included as Exhibit "C" that depicts the disposal interval from the east side of River Gas's field to the east side of our field.

Section 2.12 - Affidavit certifying that a copy of the Class II Injection Permit package has been sent to all operators, owners and surface owners. Attached as Exhibit "D".

Should you require any additional information, please contact Shad Frazier at (281) 873-1227.

Sincerely,

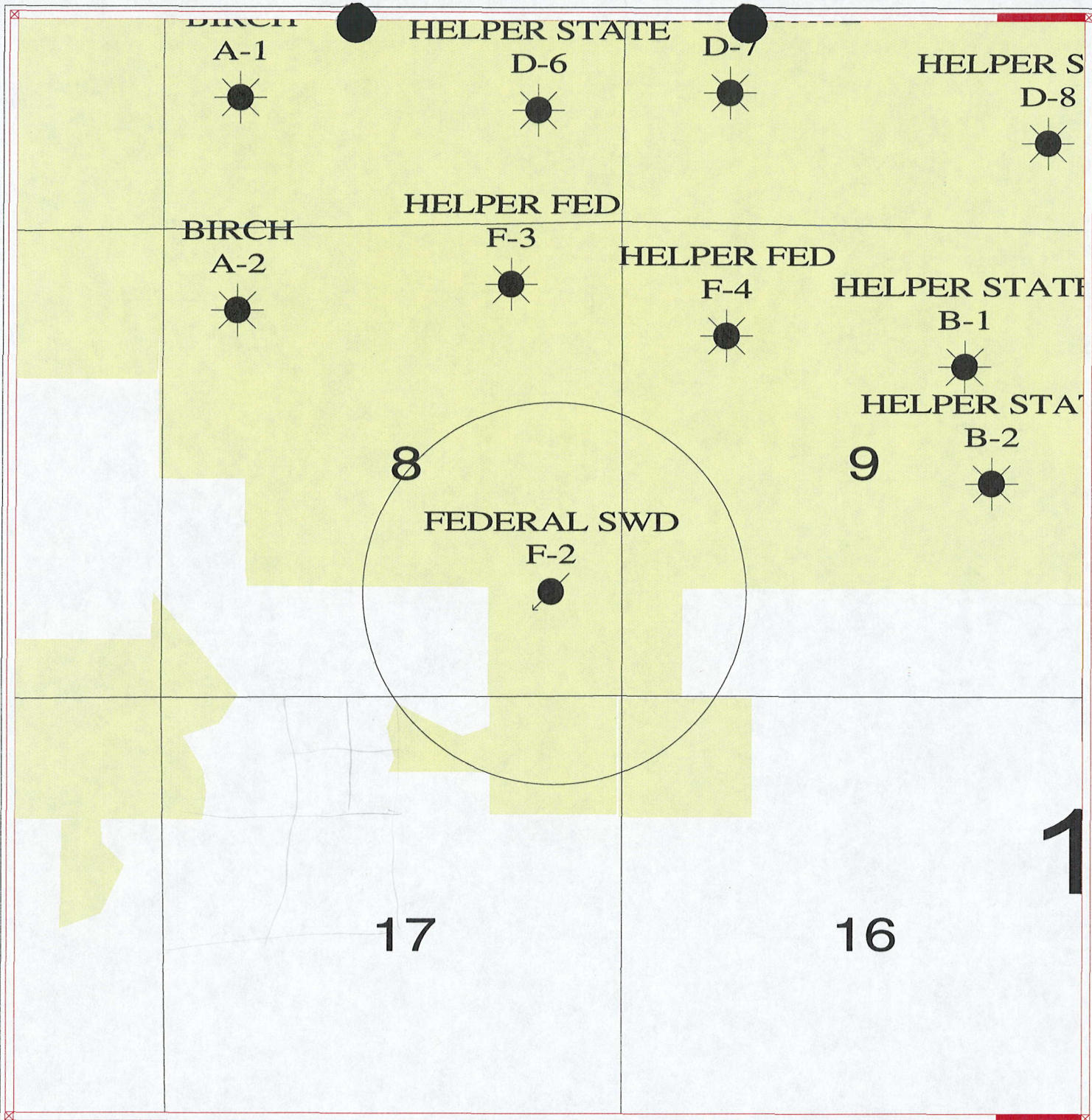
Shad Frazier
Engineer



*This represents a
change in the
max pressure
stated on the Form 1
from 1300# to 1400#*

*No structural
map per 2.10
provided
10/7/99
CF*

Exhibit “A”



Anadarko Petroleum Corporation

Helper SWD Permit
Surface Ownership
Well in Area

Keith Buck

09/20/1999

Scale 1:19464.18

| | |
|---|-------------------------------------|
| P. O. BOX 5630, T. A., DENVER, CO 80217 | NW/4 SECTION 16 |
| 8350 E CRESCENT PARKWAY, SUITE 400, ENGLEWOOD, CO 80111 | NW/4 SECTION 16 |
| 47 NORTH 500 EAST KAYSVILLE, UT 84307 | NW/4 SECTION 16 |
| 675 EAST 500 SOUTH, SUITE 500, SALT LAKE CITY, UT 84102 | NW/4 SECTION 16 |
| 2961 E CAITLAND COURT, SALT LAKE CITY, UTAH | N/2NE/4 SECTION 17 |
| 1155 NORTH CARBONVILLE ROAD, PRICE, UT 84501 | N/2NE/4 SECTION 17 |
| 525 WOOD HILL RD, PRICE, UT 84501 | N/2NE/4 SECTION 17 |
| 650 NORTH GARDNER PRICE, UT 84501 | N/2NE/4 SECTION 17 |
| SCOFIELD ROUTE BOX 280, HELPER, UT 84526 | N/2NE/4 SECTION 17 |
| 745 NORTH 430 WEST, PRICE, UT 84501 | N/2NE/4 SECTION 17 |
| 69 B STREET, HELPER, UT 84526 | N/2NE/4, NE/4NE/4NW/4 SECTION 17 |
| 1021 NORTH 200 EAST, PRICE, UT 84501 | N/2NE/4 SECTION 17 |
| 745 NORTH 100 EAST, PRICE, UTAH | NE/4NE/4NW/4 SECTION 17 |
| RT 1, BOX 56-M, HELPER, UT 84526 | NE/4NE/4NW/4 SECTION 17 |
| 289 SOUTH 100 EAST, WELLINGTON, UT 84542 | NE/4NE/4NW/4 SECTION 17 |
| P.O. BOX 45155, SALT LAKE CITY, UT 84145 | S/2NE/4, E/2SW/4, SE/4 SECTION 8 |
| 795 NORTH 400 EAST PRICE, UT M 84501 | S/2NE/4, E/2SW/4, N/2SE/4 SECTION 8 |
| 81 WEST MAIN, PRICE, UT 84501 | S/2NE/4, E/2SW/4, N/2SE/4 SECTION 8 |
| C/O JUNE OLIVETO | SE/4SE/4 SECTION 8 |
| P. O. BOX 416 PRICE, UT 84501 | SW/4SE/4 SECTION 8 |
| 5908 SOUTH 5900 WEST HOOPER, UT 84501 | SW/4SE/4 SECTION 8 |
| 3712 REDBLUFF LANE GLENWOOD SPRINGS, CO 81601 | SW/4SE/4 SECTION 8 |
| 722 NORTH 1550 WEST PRICE UT 84501 | SW/4SE/4 SECTION 8 |
| 263 NORTH CARBON AVENUE, PRICE, UT 84501 | SW/4SE/4 SECTION 8 |
| 394 SOUTH 100 WEST REDMOND, UT 84652 | SE/4SW/4 SECTION 8 |
| 504 WEST 1100 NORTH PRICE, UT 84501 | SE/4SW/4 SECTION 8 |
| 115 WEST 1000 NORTH HELPER, UT 84526 | SE/4SW/4 SECTION 8 |
| 700 WEST 1220 NORTH PRICE, UT 84501 | SE/4SW/4 SECTION 8 |
| C/O BUTCH ZEDDIES 446 GUNNISON DR BALLWIN, MO 53011 | SE/4SW/4 SECTION 8 |
| 4870 BRIARGROVE DR GROVEPOINT , OH 43125 | SE/4SW/4 SECTION 8 |
| RT 1 BOX 145 A PRICE, UT 84501 | SE/4SW/4 SECTION 8 |
| RT 2 BOX 27-A-1 PRICE, UT 84501 | SE/4SW/4 SECTION 8 |
| 7644 OUTLOOK AVE. OAKLAND, CA 94605 | SE/4SW/4 SECTION 8 |
| 605 WEST 1100 NORTH PRICE, UT 84501 | SE/4SW/4 SECTION 8 |
| 1020 NORTH 720 WEST PRICE, UT 84501 | SE/4SW/4 SECTION 8 |
| RT 1, BOX 145A HELPER, UT 84526 | SE/4SW/4 SECTION 8 |
| 4388 NORTH 2000 WEST HELPER, UT 84526 | SE/4SW/4 SECTION 8 |

FEDERAL F1 SWD INJECTION WELL NOTICES
NW/4, N/2SW/4, SW/4SW/4, W/2SE/4SW/4, SECTION 9, T14S, R10E
HELPER COALBED METHANE PROJECT
CARBON COUNTY, UTAH

| | | | |
|-----------------------------|---|--|-----------------------|
| BUREAU OF LAND MANAGEMENT | M | P. O. BOX 45155, SALT LAKE CITY, UT 84145 | W/2 SECTION 9 |
| SMITH, HENRY CHAPMAN | S | 47 NORTH 500 EAST, KAYSVILLE, UT 84307 | W/2 SECTION 9 |
| CARBON COUNTY | S | 120 E MAIN, PRICE, UT 84501 | W/2 SECTION 9 |
| PEAK CABLEVISION | S | 5655 S YOSEMITE #304, ENGLEWOOD, CO 80111 | W/2 SECTION 9 |
| QUESTER SERVICE CORP | S | P. O. BOX 45433, SALT LAKE CITY, UT 84145 | W/2 SECTION 9 |
| MORGAN, MAX & DEEANN | S | 1419 VALLEY VIEW, WELLINGTON UT 84542 | W/2 SECTION 9 |
| HARWOOD, OWEN | S | 1341 EAST SEVILLE WAY, BOUNTIFUL, UT 84010 | W/2 SECTION 9 |
| KISSELL, HOWARD & JOANN | S | 907 NORTH 1ST EAST, PRICE, UT 84501 | PARK CREST COVE NO. 1 |
| BUTLER, ROSS & MARGARET | S | 917 NORTH 100 EAST, PRICE UT 84501 | PARK CREST COVE NO. 1 |
| PAGE, MARK & SHEILA | S | 927 NORTH 1ST EAST, PRICE UT 84501 | PARK CREST COVE NO. 1 |
| EPISCOPAL DIOCESE OF UTAH | S | P. O. BOX 3090, SALT LAKE CITY, UT 84110 | PARK CREST COVE NO. 1 |
| MAGLEBY, TED & REGI TR | S | 959 NORTH 100 EAST, PRICE, UT 84501 | PARK CREST COVE NO. 1 |
| BURGE, STEVEN & DENETTE | S | 969 NORTH 100 EAST, PRICE, UT 84501 | PARK CREST COVE NO. 1 |
| LABAHN, RAY & NANCY | S | 983 NORTH 100 EAST, PRICE UT 84501 | PARK CREST COVE NO. 1 |
| BISHOP, JENSEN & MERLIN, TR | S | 101 E COVE CREST DRIVE, PRICE , UT 84501 | PARK CREST COVE NO. 1 |
| HAMMACK, TIM & TRACY | S | 91 COVE CREST DR, PRICE, UT 84501 | PARK CREST COVE NO. 1 |
| JENSEN, FRANKIE | S | 88 EAST 900 NORTH, PRICE, UT 84501 | OLSEN'S RESERVOIR |
| BANASKY, PAMELA | S | 74 EAST 900 NORTH, PRICE UT 84501 | OLSEN'S RESERVOIR |
| THOMAS, CURTIS & JANEAN | S | 385 WEST 300 SOUTH, GENOLA, UT 84655 | OLSEN'S RESERVOIR |
| JULIAN, DEAN & CONNIE | S | 908 W WADLEIGH, PRICE, UTAH | THE COVES, PLAT A |
| POGLAJEN, MISTI | S | 918 WADLEIGH LANE, PRICE, UT 84501 | THE COVES, PLAT A |
| HEKMAT, ALI | S | 928 WADLEIGH LANE, PRICE, UT 84501 | THE COVES, PLAT A |
| EVANS, PAULINE TR | S | 934 WADLEIGH LANE, PRICE UT 84501 | THE COVES, PLAT A |
| STEVENS, THURMAN & LORRAINE | S | 938 WADLEIGH LANE, PRICE, UT 84501 | THE COVES, PLAT A |
| SIMMONS, NEIL & ROSE | S | 944 WADLEIGH LANE, PRICE, UT 84501 | THE COVES, PLAT A |
| GILBERT, RALPH & KARYN | S | 950 WADLEIGH LANE, PRICE, UT 84501 | THE COVES, PLAT A |
| TAYLOR, DUANE & JOAN | S | 325 COVECREST DR, PRICE, UT 84501 | THE COVES, PLAT A |
| RACKLEY, IRVIN & NICOLE | S | 973 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |
| WHITE, DONNA | S | 961 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |

| | | | |
|---------------------------|---|--|-------------------|
| KINSEY, GEORGE & BILLIE | S | 951 N SMITH DR, PRICE, UT, 84501 | THE COVES, PLAT A |
| VANZANT, JOYCE | S | 941 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |
| MCCLUNG, JOHN & PATRICIA | S | 931 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |
| BURGESS, MARTY | S | 921 N SMITH SR, PRICE, UT 84501 | THE COVES, PLAT A |
| LARSEN, CARL & PATRICIA | S | 909 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |
| SALAZAR, CHARLES & SHERRI | S | 18 EAST 900 NORTH, PRICE, UT 84501 | THE COVES, PLAT A |
| NEWBOLD, KELLY & LYNNETTE | S | 28 EAST 900 NORTH, PRICE, UT 84501 | THE COVES, PLAT A |
| POWELL, KENT & KRISTINE | S | 36 EAST 900 NORTH, PRICE, UTAH 84501 | THE COVES, PLAT A |
| GRAMLICH, CARL & JENNIFER | S | 46 EAST 900 NORTH, PRICE, UT 84501 | THE COVES, PLAT A |
| PAPAZAHARIS, STEVEN | S | 59 EAST 900 NORTH, PRICE, UT 84501 | THE COVES, PLAT A |
| RARICK, MICHAEL & DORIS | S | 37 EAST 900 NORTH, PRICE, UT 84501 | THE COVES, PLAT A |
| HOYT, STEVE & JANA | S | 920 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |
| BENTLY, KEVIN & WENDY | S | 930 N SMITH SR, PRICE, UT 84501 | THE COVES, PLAT A |
| HACKFORD, WALTER & TERESA | S | 940 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT A |
| WILLIS, DENNIS & THERESA | S | 941 WADLEIGH, PRICE, UT 84501 | THE COVES, PLAT A |
| SANCHEZ, JAMES | S | P. O. BOX 229, PRICE, UT 84501 | THE COVES, PLAT A |
| JOHNSON, MIKEL & VALERIE | S | 59 EAST 900 NORTH, PRICE, UT 84501 | THE COVES, PLAT A |
| MONFROOY, TOM & LUCY | S | 49 EAST 900 NORTH, Price, ut 84501 | THE COVES, PLAT A |
| VANCE, KATHY | S | 80 E HILLCREST DR, PRICE, UT 84501 | THE COVES, PLAT A |
| HANSEN, RYAN & DOROTHY | S | 70 E HILLCREST, PRICE, UT 84501 | THE COVES, PLAT A |
| POHLMAN, CINDY | S | 50 E HILLCREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| HOWARD, GARY & KOTE | S | 60 E HILLCREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| KOURIANOS, TONY & DEBRA | S | 974 SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| WING, RICHARD & BETTY | S | 977 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| JOHNSON, PHILIP | S | 987 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| VOSE, PATSY | S | 991 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| LEAVITT, JOSEPH | S | 4416 E JANICE WAY, PHOENIX, AZ 85032 | THE COVES, PLAT B |
| BYRD, JIM & BILLIE JO | S | 505 S MAIN, SUITE H, BOUNTIFUL, UT 84010 | THE COVES, PLAT B |
| SAFELY, MARVIN & JOLENE | S | 44 E SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| BAKER, DON | S | 36 E SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| MARTINEZ, PAT & CAROL | S | 992 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| STEFANOFF, RONALD & JENNY | S | 988 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| PRESSETT, JON & GAYLA | S | 982 SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| SHINER, DAVID & NADINE | S | P. O. BOX 1034, PRICE, UT 84501 | THE COVES, PLAT B |
| TRUSCOTT, LEO & DIANE | S | 41 E SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |

| | | | |
|----------------------------|---|--------------------------------------|-------------------|
| STORRS, JAY & ELAYNE | S | 47 SMITH CIRCLE, PRICE, UT 84501 | THE COVES, PLAT B |
| OMAN, BRENT & DIONNE | S | 53 SMITH CIRCLE, PRICE, UT 84501 | THE COVES, PLAT B |
| HIGHT, DAVID & MELANIE | S | 59 E HILLCREST DR, RICE, UT 84501 | THE COVES, PLAT B |
| PICCOLO, JOE & BARBARA ANN | S | 69 E HILLCREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| WARNER, NEAL | S | 76 E COVECREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| KULOW, JAMES & VICKI | S | 64 E COVECREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| GILL, MARVIN | S | P. O. BOX 10515, TAMPA, FL 33679 | THE COVES, PLAT B |
| POGLAJEN, CONSTANCE | S | P. O. BOX 85, PRICE, UT 84501 | THE COVES, PLAT B |
| HOLBROOK, TERRY & CYNTHIA | S | 1011 COVECREST, PRICE, UT 84501 | THE COVES, PLAT B |
| MAY, TERRY & SANDRA | S | 75 COVECREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| KOSS, ERNIE & JENANN | S | 42 HILLCREST DR, PRICE, UT 84501 | THE COVES, PLAT B |
| FOGG, DONALD & PATTY ANN | S | 999 N SMITH DR, PRICE, UT 84501 | THE COVES, PLAT B |
| LEAVITT, JOSEPH | S | 4416 JANICE WAY, PHOENIX, AZ 85032 | THE COVES, PLAT C |
| HENRIE, EPH | S | 475 N CARBONDALE RD, PRICE, UT 84501 | THE COVES, PLAT C |

SECTION 8 TOWNSHIP 14 SOUTH, RANGE 10 EAST

8

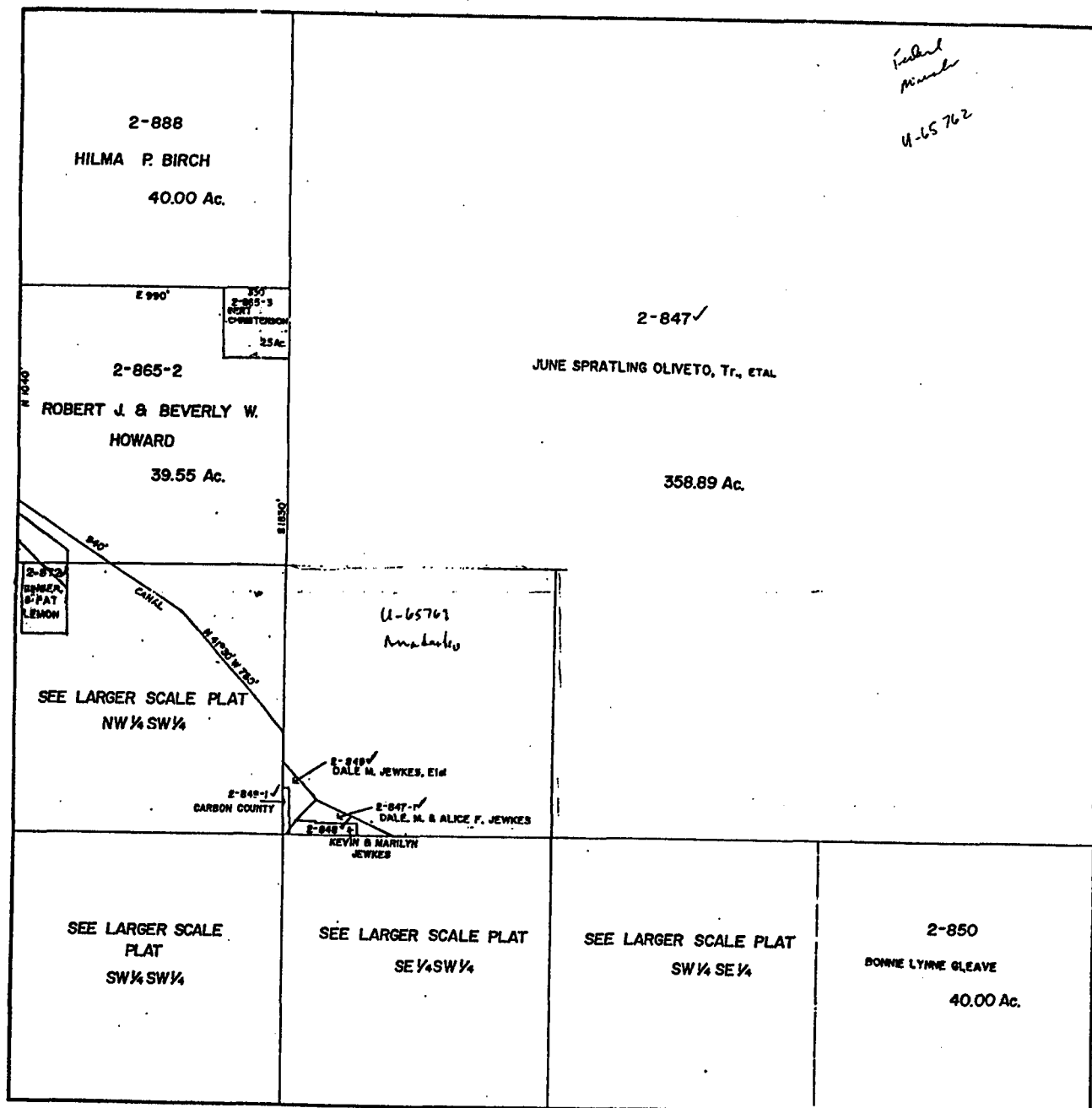
TOWNSHIP

14

SOUTH, RANGE

10

EAST



CARBON COUNTY PLATS

SE 1/4 SW 1/4
SECTION

8

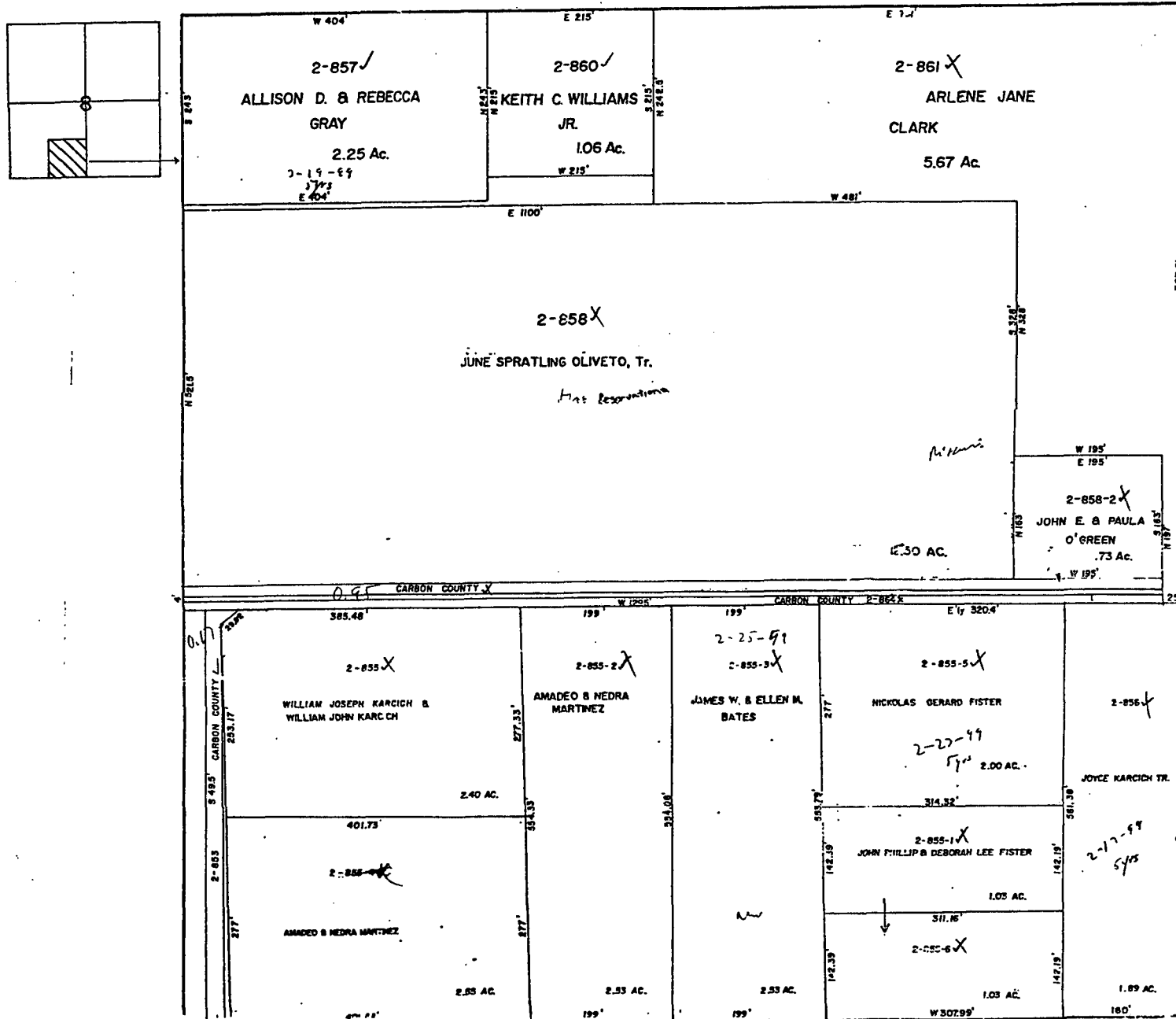
TOWNSHIP

14

SOUTH, RANGE

10

EAST



CARBON COUNTY PLATS

SW 1/4 SE 1/4
SECTION

8

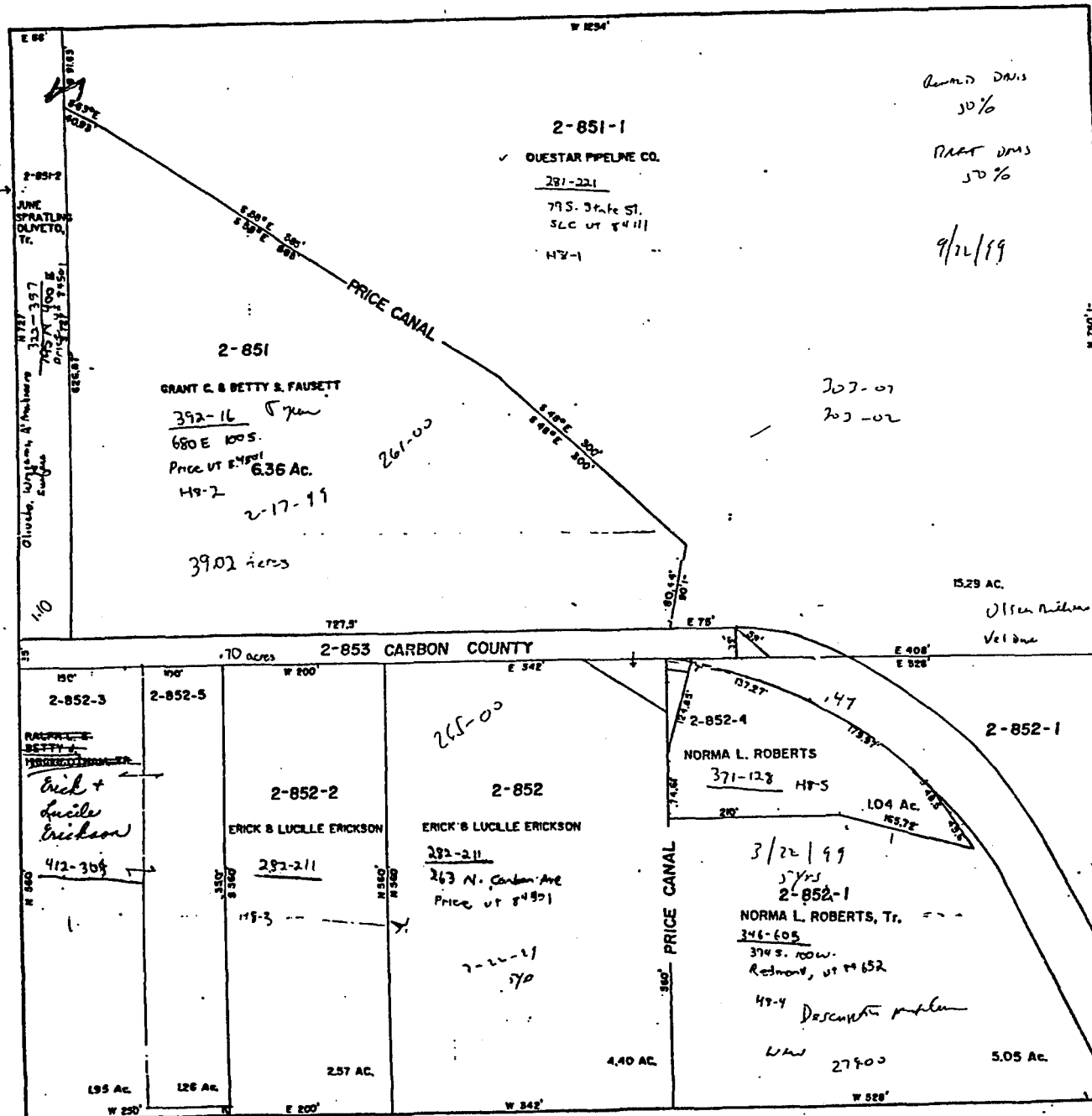
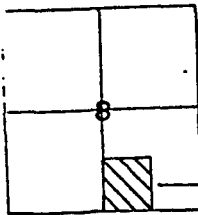
TOWNSHIP

14

SOUTH, RANGE

10

EAST



c - 1 - 100 foot - 1 inch

CARBON COUNTY PLATS

NW1/4
SECTION 16

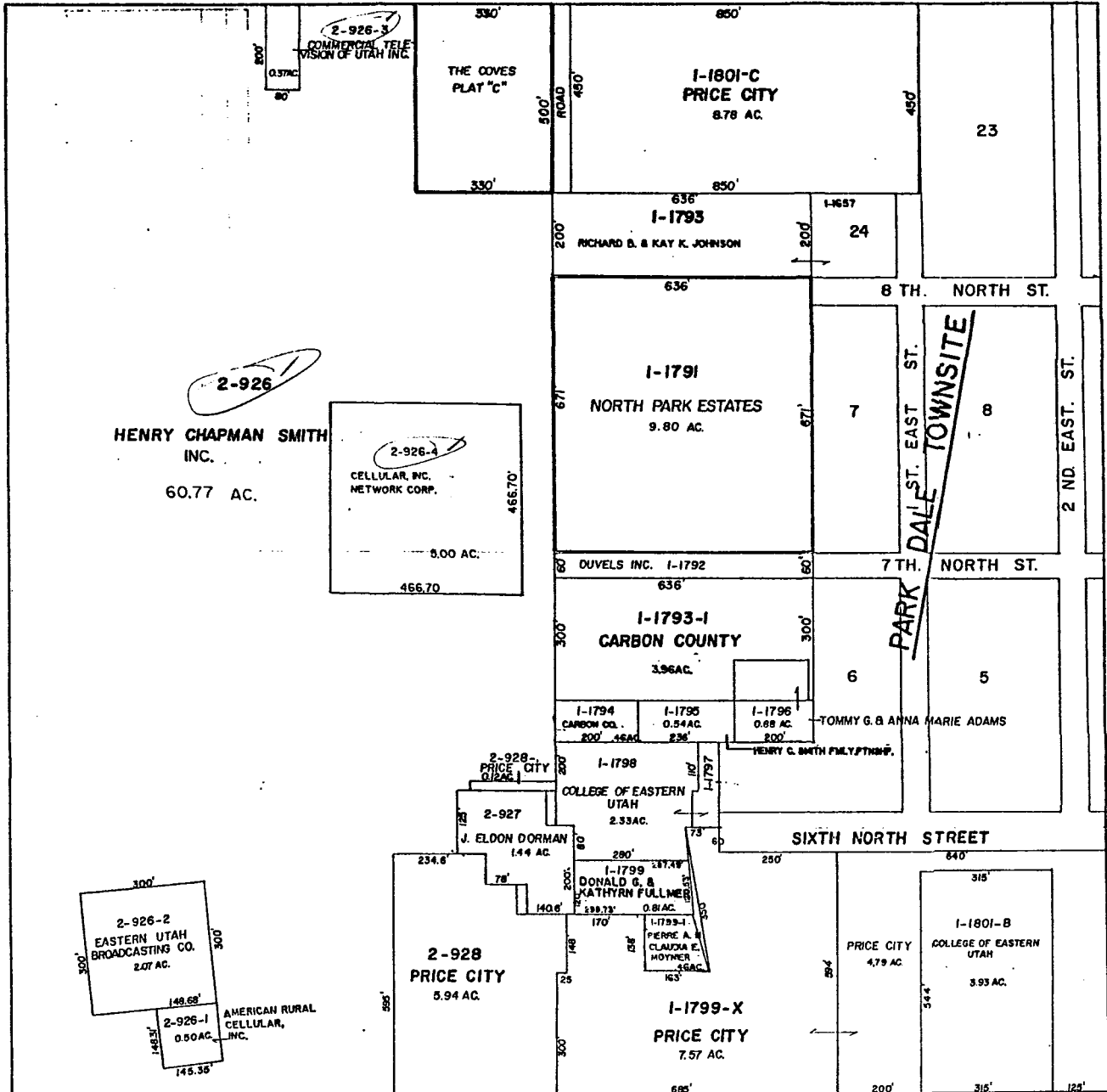
TOWNSHIP

14

SOUTH, RANGE

10

EAST



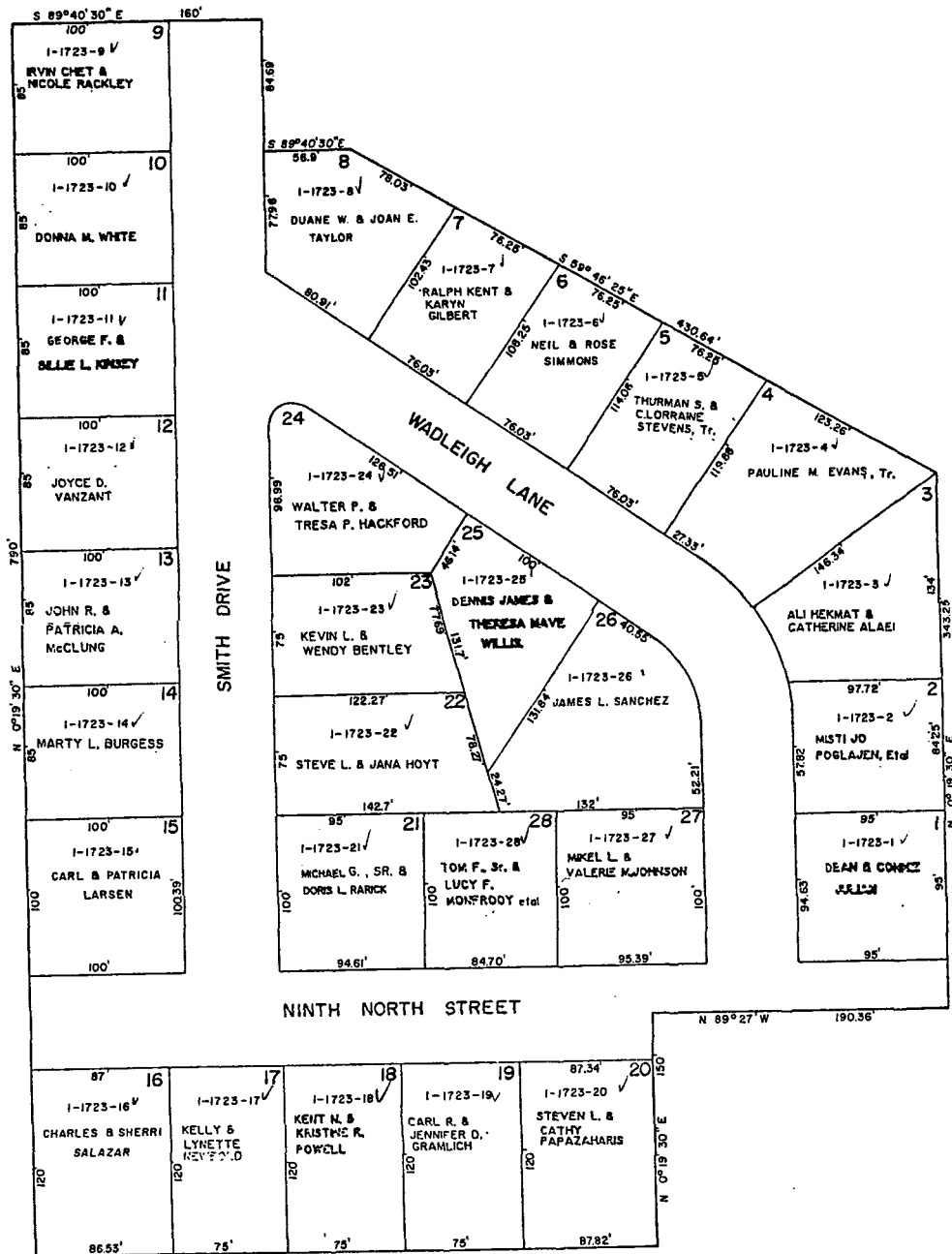
Scale 200 feet-1 inch

CARBON COUNTY PLATS

THE COVES (PLAT A)

PART OF SW1/4 SEC. 9, T.14 N., R.10 E.

PRICE CITY



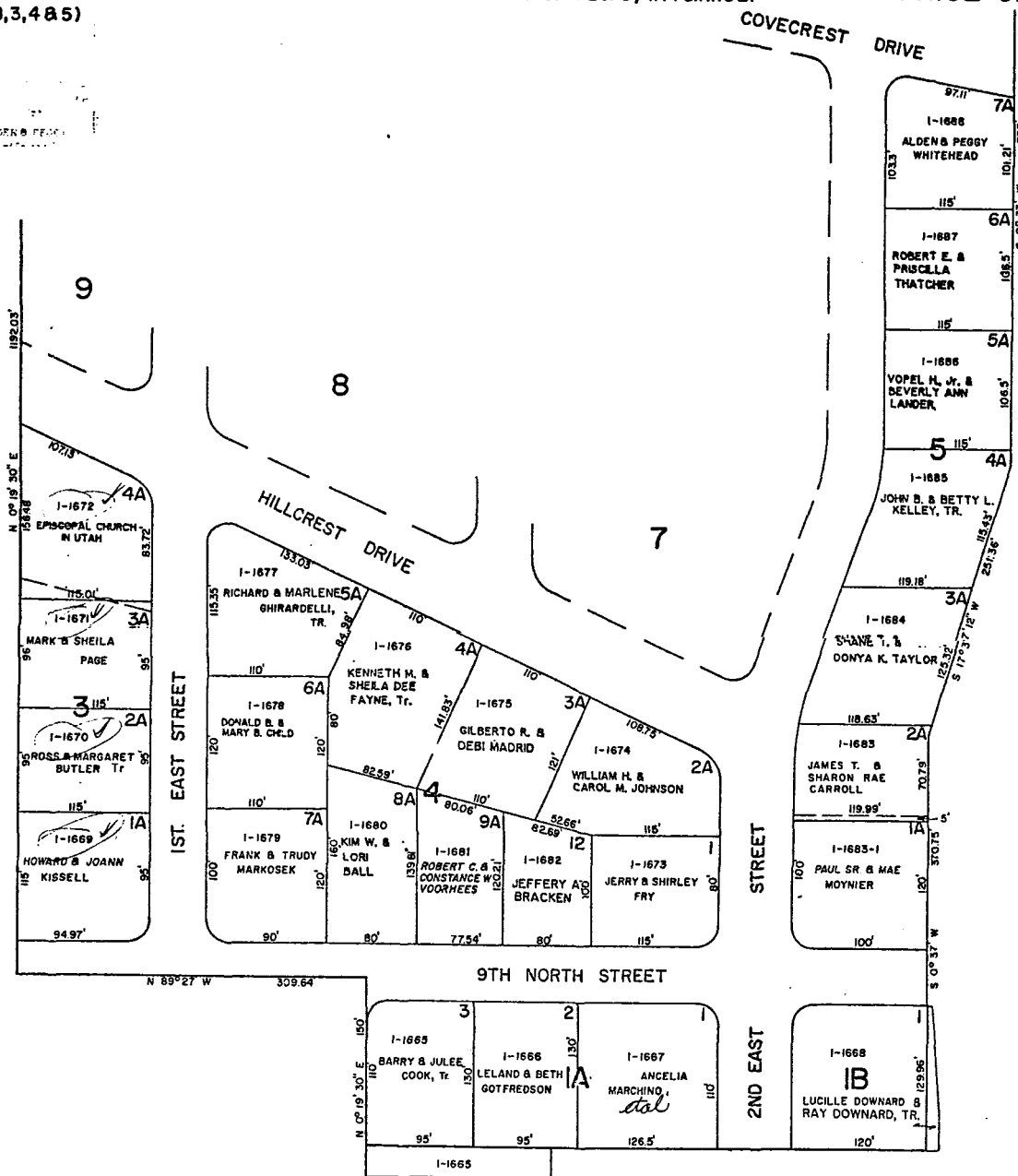
Scale 60 feet=1 inch

CARBON COUNTY PLATS

PARKCREST COVE NO. 1 (AMENDED)
(BLOCKS 1A, 1B, 3, 4 & 5)

PART OF SEC. 9, T.14 S.R.10E.

PRICE CITY



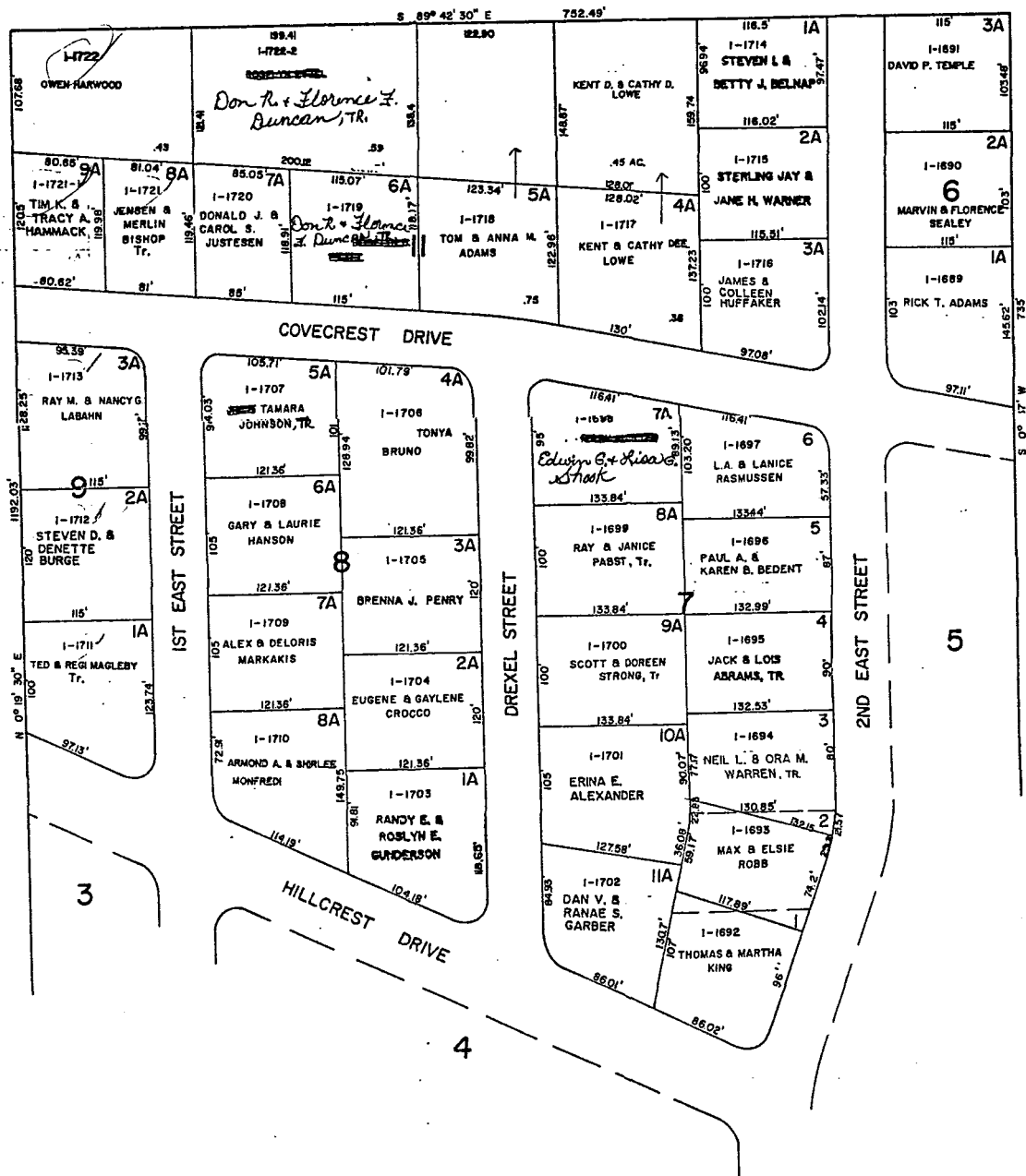
Scale 80 feet-1 inch

CARBON COUNTY PLATS

PARKCREST COVE NO.1 (AMENDED)
(BLOCKS 6,7,8,9 &11)

PART OF SEC. 9, T.14S.R.10E.

PRICE CITY



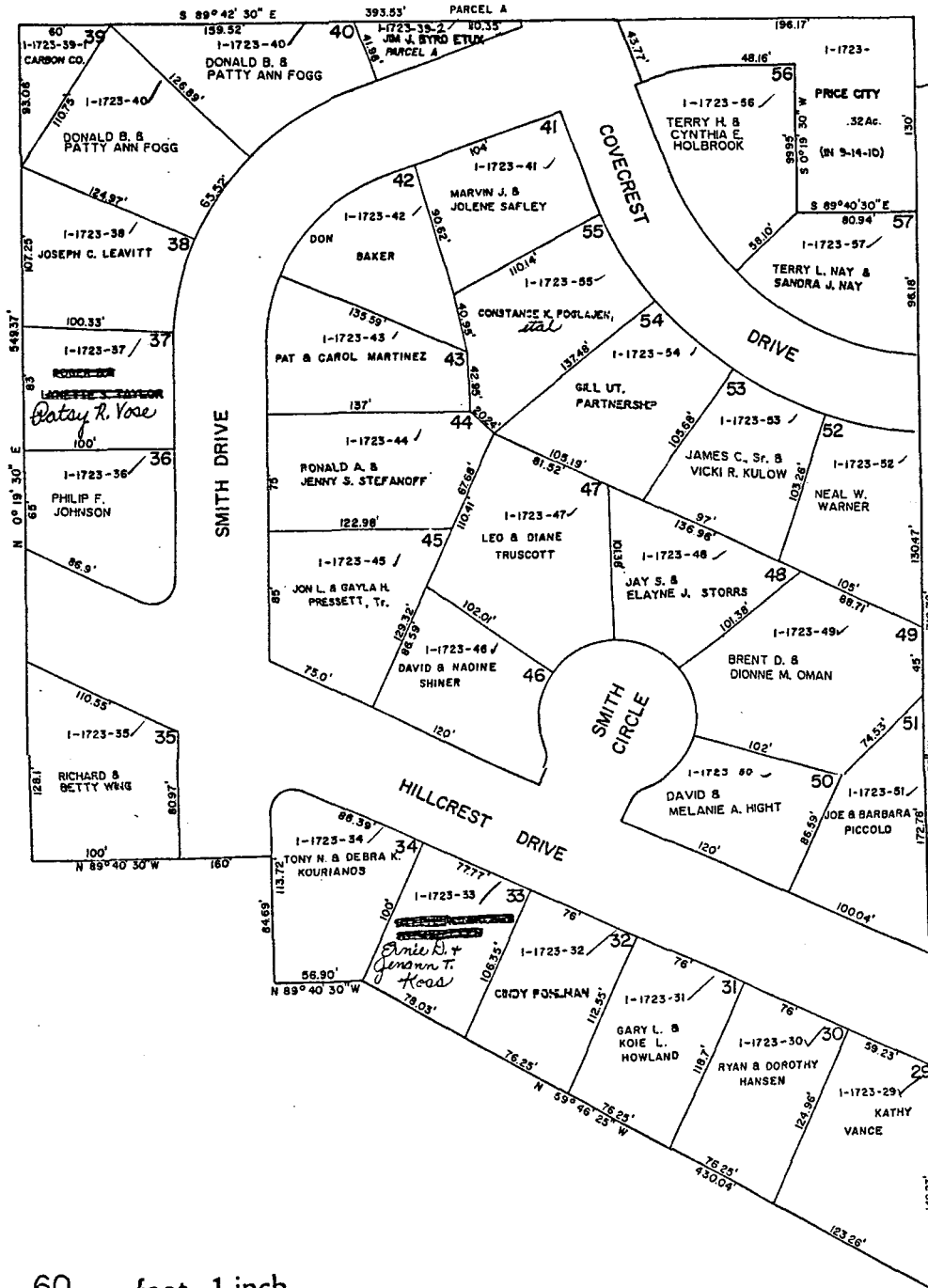
Scale 80 feet-1 inch

CARBON COUNTY PLATS

THE COVES (PLAT B & AMENDED B)

PART OF SW1/4 SEC. 9, T.14S.R.10E.

PRICE CITY



185 East Main
Price, UT 84501

Scale 60 feet-1 inch

-1 inch

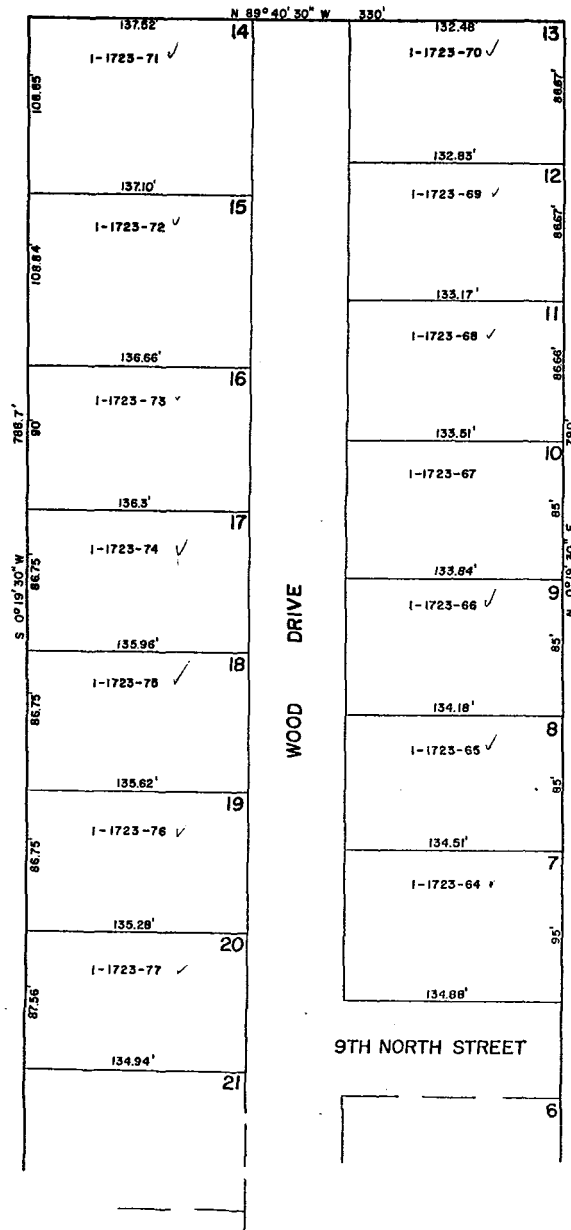
CARBON COUNTY PLATS

THE COVES (PLAT C)

PART OF SEC. 9 & 16, T.14S.R.10E.

PRI

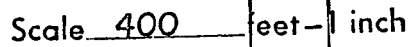
(THE PORTION NORTH OF 9TH NORTH STREET)



NOTE: ALL L.
LEAVIT

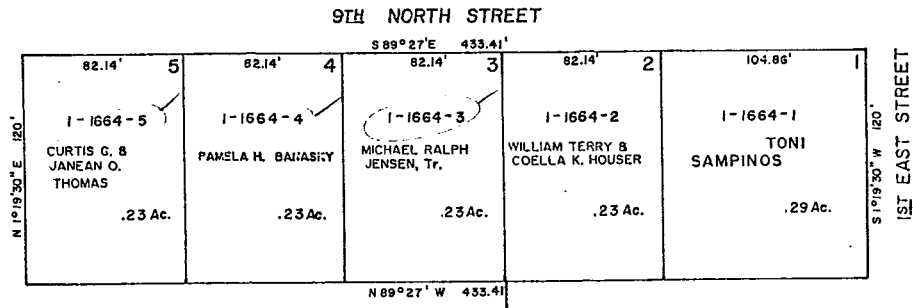
Scale 60 feet-1 inch

EAST



CARBON COUNTY PLATS

OLSEN'S RESERVOIR SUBDIVISION



Scale 50 feet = 1 inch

CARBON COUNTY PLATS

NW 1/4
SECTION

17

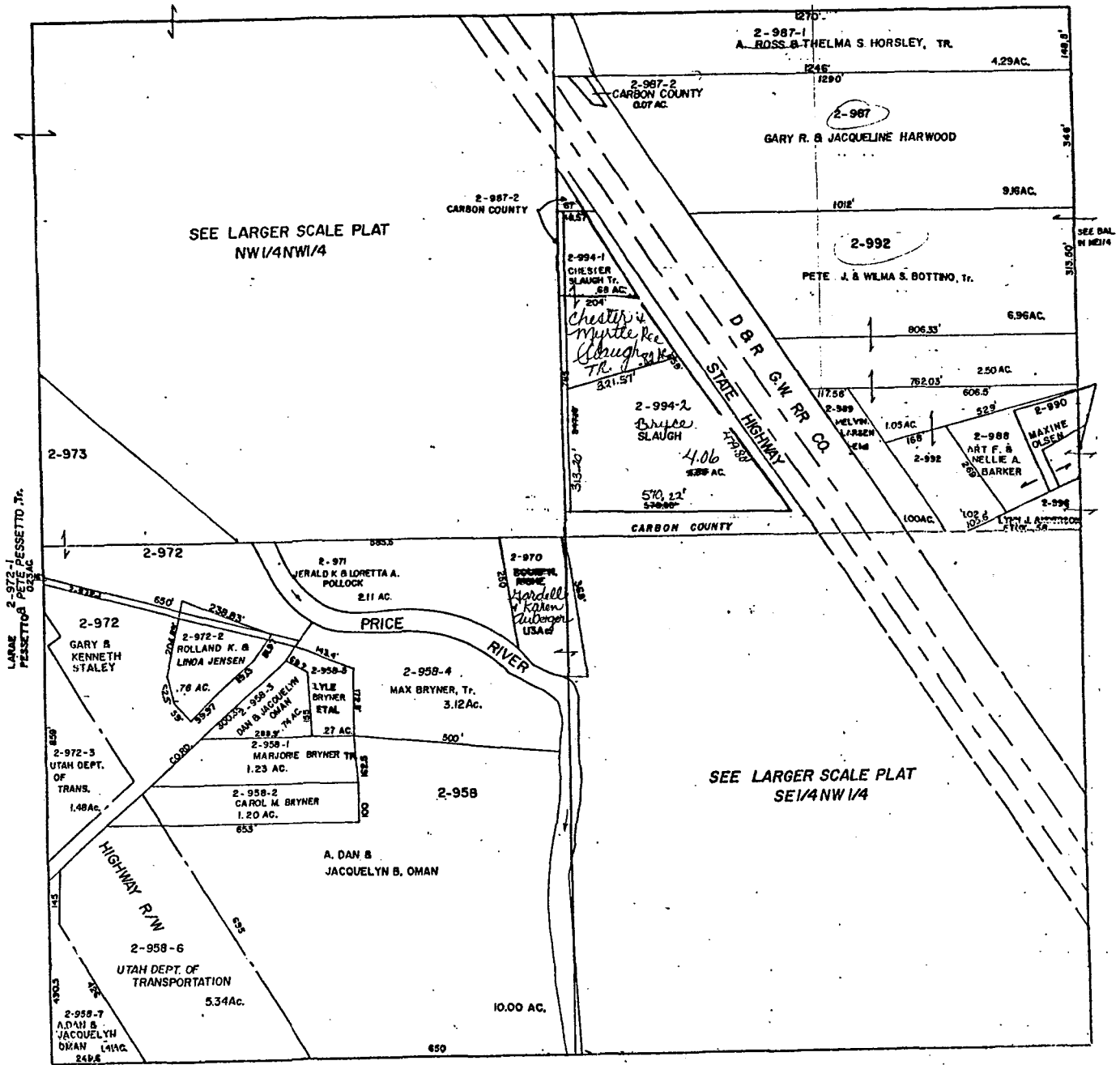
TOWNSHIP

14

SOUTH, RANGE

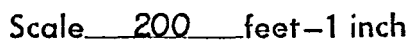
10

EAST



Scale 200 feet-1 inch

EAST



CARBON COUNTY PLATS

SW1/4 NE1/4
SECTION

17

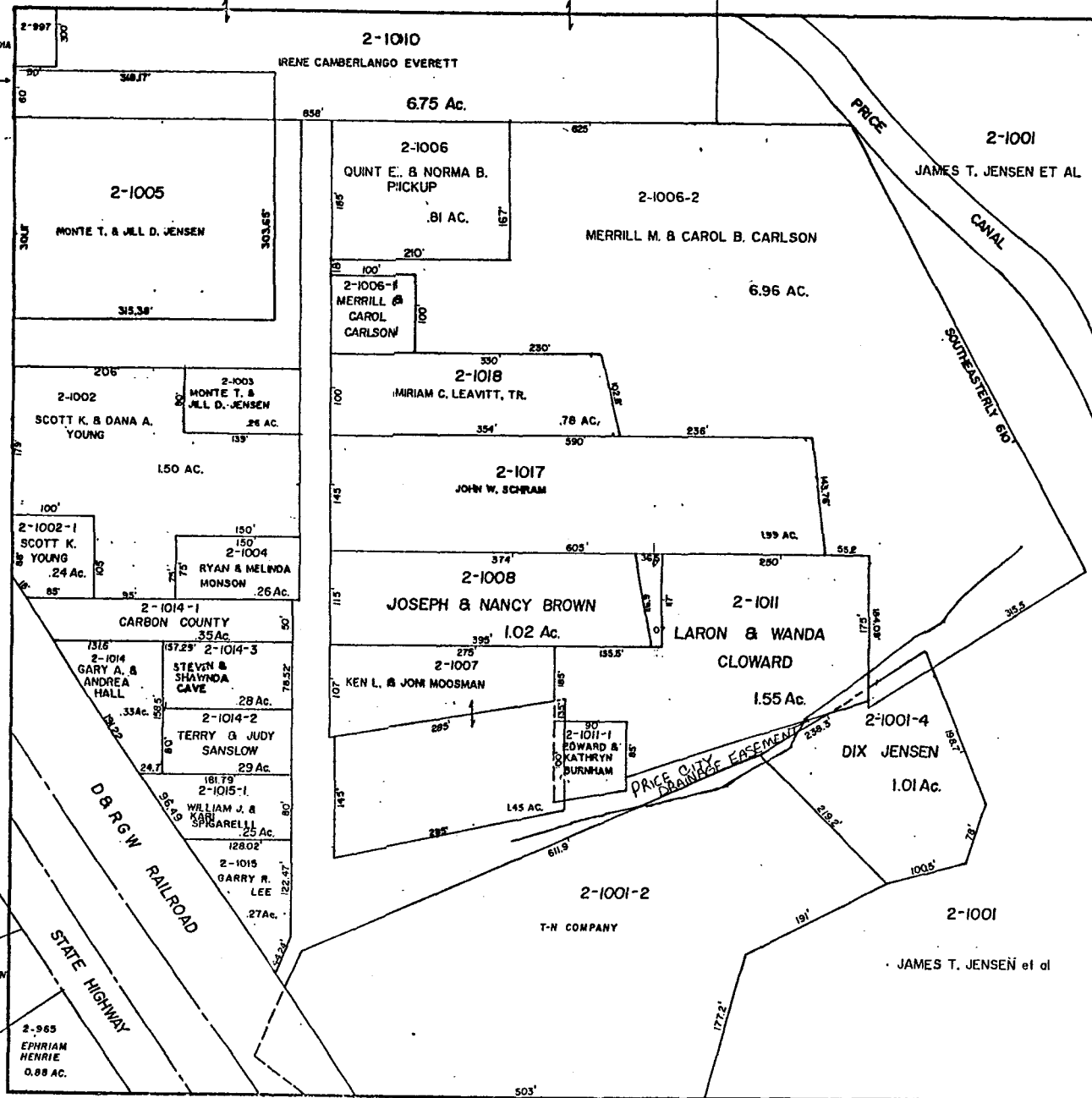
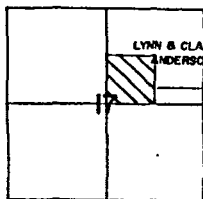
TOWNSHIP

14

SOUTH, RANGE

10

EAST



Scale 100 feet-1 inch

Exhibit “B”

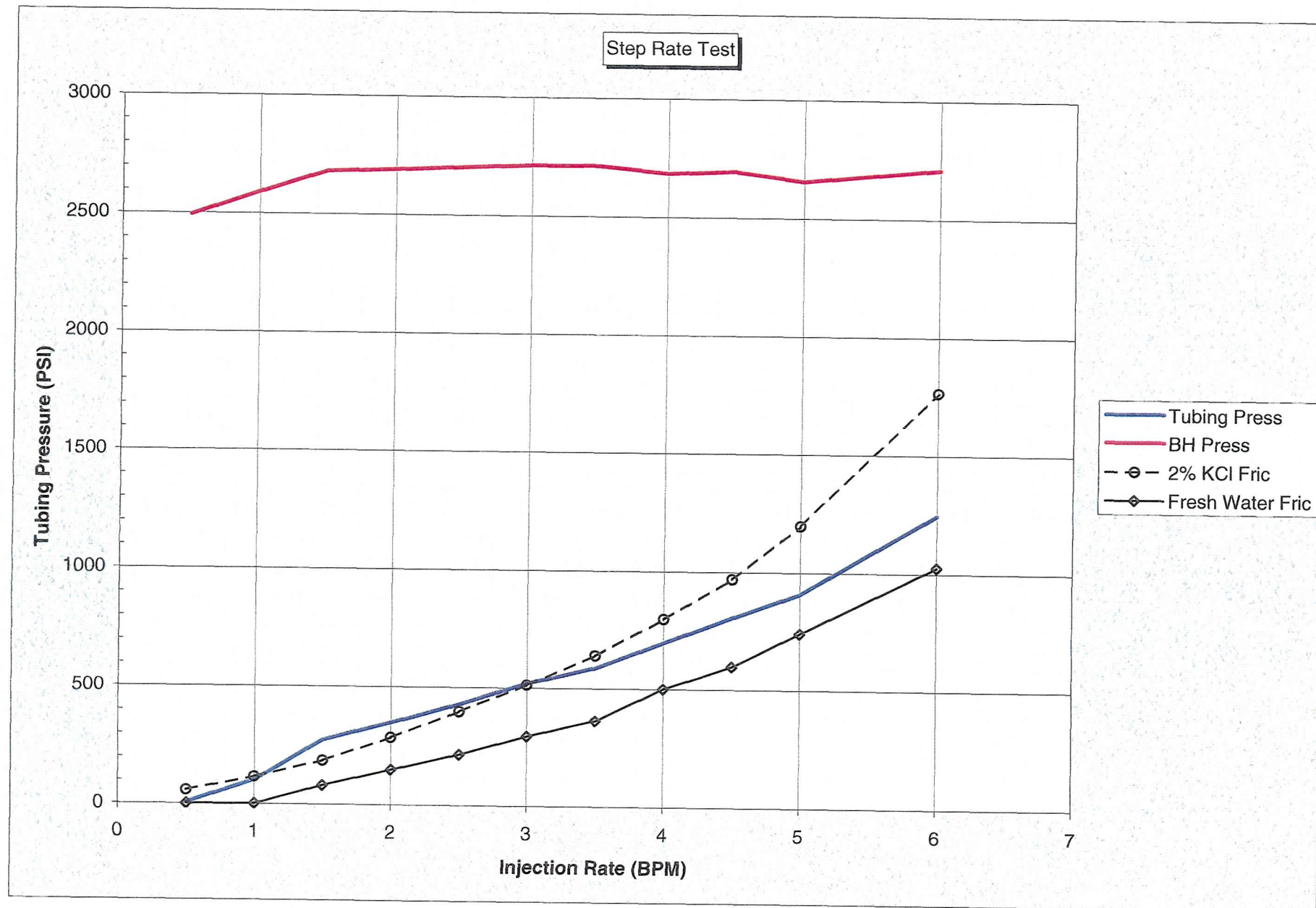


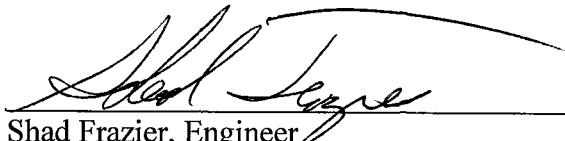
Exhibit “C”

Exhibit “D”

AFFIDAVIT


**Re: Helper Federal F-2 SWD
Injection Permit
Section 8-T14S-R10E
Carbon County, Utah**

I, the undersigned Shad Frazier, do hereby declare that a copy of the application for a Class II Injection Permit has been mailed, by certified mail on September 23, 1999, to all Surface and/or Mineral Interest Owners within a one-mile radius of this above-referenced well.



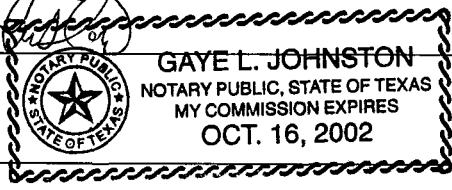
Shad Frazier, Engineer
Anadarko Petroleum Corporation

Subscribed and sworn to before me on this 24th day of September 1999:



Notary Public

My commission expires _____





State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Kathleen Clarke
Executive Director

Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210

PO Box 145801

Salt Lake City, Utah 84114-5801

801-538-5340

801-359-3940 (Fax)

801-538-7223 (TDD)

October 1, 1999

SENT VIA E-MAIL AND FAX

Newspaper Agency Corporation
Legal Advertising
PO Box 45838
Salt Lake City, Utah 84145

Re: Notice of Agency Action - Cause No. UIC-243

Gentlemen:

Enclosed is a copy of the referenced Notice of Agency Action. Please publish the Notice, once only, as soon as possible. Please send proof of publication and billing to the Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, P.O. Box 145801, Salt Lake City, Utah 84114-5801.

Sincerely,

A handwritten signature in cursive script that reads "Larraine Platt".

Larraine Platt
Secretary

Enclosure



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Kathleen Clarke
Executive Director

Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210

PO Box 145801

Salt Lake City, Utah 84114-5801

801-538-5340

801-359-3940 (Fax)

801-538-7223 (TDD)

October 1, 1999

Sun Advocate
P.O. Box 870
845 East Main
Price, Utah 84501-0870

Re: Notice of Agency Action - Cause No. UIC-243

Gentlemen:

Enclosed is a copy of the referenced Notice of Agency Action. Please publish the Notice, once only, as soon as possible. Please send proof of publication and billing to the Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, P.O. Box 145801, Salt Lake City, Utah 84114-5801.

Sincerely,

Lorraine Platt
Secretary

Enclosure

R649-5-2. Requirements For Class II Injection Wells Including Water Disposal Storage And Enhanced Recovery Wells.

Anadarko Federal F-25WD 4300730555

COMMENTS

SESE 5.8, T14S, R10E

1. Injection wells shall be completed, equipped, operated, and maintained in a manner that will prevent pollution and damage to any USDW, or other resources and will confine injected fluids to the interval approved.

2. The application for an injection well shall include a properly completed UIC Form 1 and the following:

2.1. A plat showing the location of the injection well, all abandoned or active wells within a one-half mile radius of the proposed well, and the surface owner and the operator of any lands or producing leases, respectively, within a one-half mile radius of the proposed injection well.

2.2. Copies of electrical or radioactive logs, including gamma ray logs, for the proposed well run prior to the installation of casing and indicating resistivity, spontaneous potential, caliper, and porosity.

2.3. A copy of a cement bond or comparable log run for the proposed injection well after casing was set and cemented.

2.4. Copies of logs already on file with the division should be referenced, but need not be refiled.

2.5. A description of the casing or proposed casing program of the injection well and of the proposed method for testing the casing before use of the well.

2.6. A statement as to the type of fluid to be used for injection, its source and estimated amounts to be injected daily.

2.7. Standard laboratory analyses of (1) the fluid to be injected, (2) the fluid in the formation into which the fluid is being injected, and (3) the compatibility of the fluids.

2.8. The proposed average and maximum injection pressures.

2.9. Evidence and data to support a finding that the proposed injection well will not initiate fractures through the overlying strata or a confining interval that could enable the injected fluid or formation fluid to enter the fresh water strata.

2.10. Appropriate geological data on the injection interval and confining beds, including the geologic name, lithologic description, thickness, depth, and lateral extent; also information relative to geologic structure near the proposed well which may effect the conveyance and/or storage of the injected fluids.

2.11. A review of the mechanical condition of each well within a one-half mile radius of the proposed injection well to assure that no conduit exists that could enable fluids to migrate up or down the wellbore and enter improper intervals.

2.12. An affidavit certifying that a copy of the application has been provided to all operators, owners, and surface owners within a one-half mile radius of the proposed injection well.

2.13. Any other additional information that the board or division may determine is necessary to adequately review the application.

OK 2.0 - UIC Form 1 included in submission

9/24/99 info
No 2.1 Plat provided but only depicts APC operated lands but not operators of adjacent lands or owners of lands in section to south within the buffer

OK 2.2 - DI and CD/CN w/ Gamma on file

OK 2.3 - CBL on file

OK 2.4 File copies used.

OK 2.5 Excellent casing diagram. Statement of proposed procedure made in commentary sheet accompanying Form 1.

OK 2.6 Statement in text of commentary sheet w/ Form 1. Requests unlimited rate @ 1300 psig.

OK 2.7 Included in submission

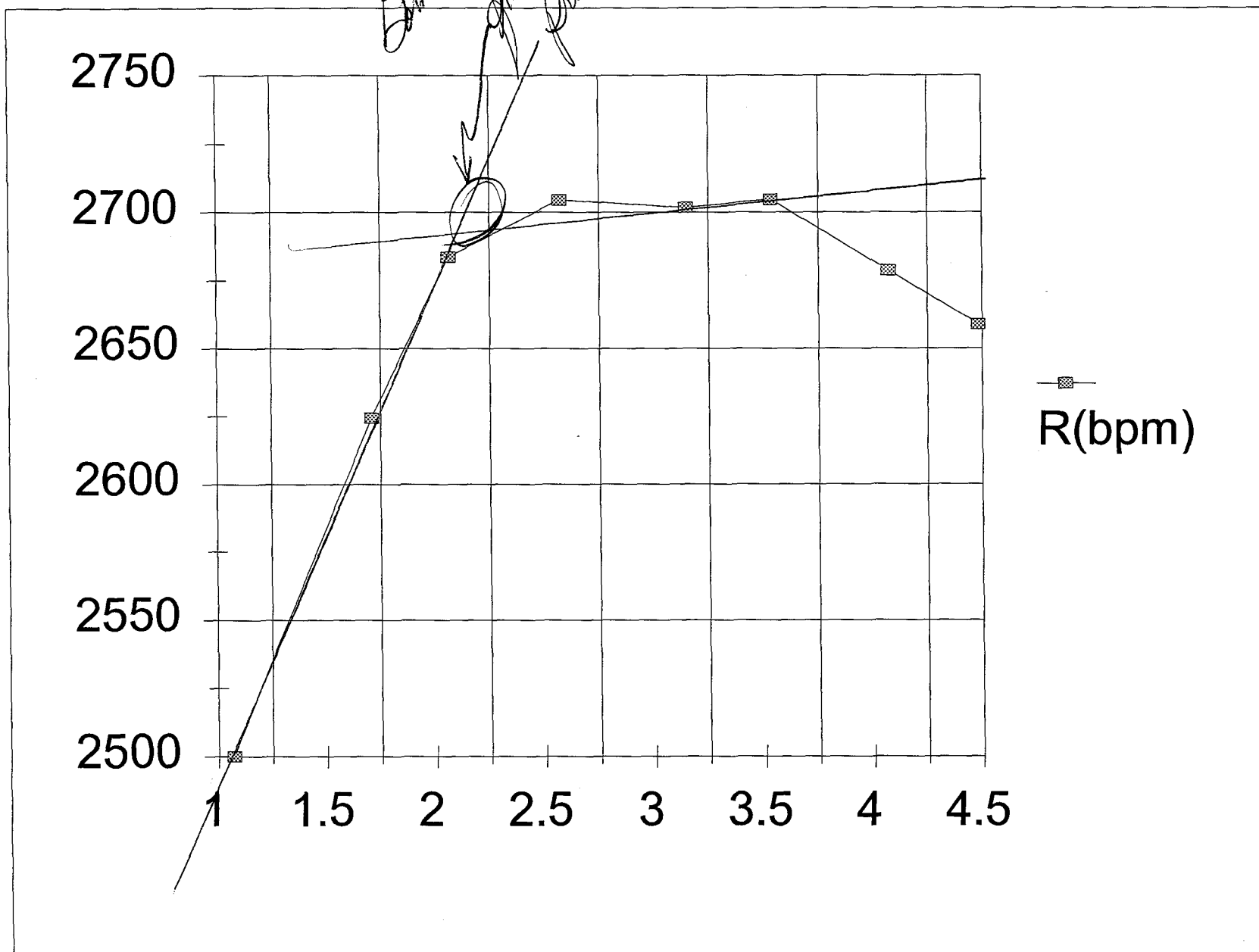
9/24/99 info
No 2.8 No prepared average and maximum injection pressures provided

OK 2.9 Step rate test indicates no formation breakdown

9/24/99 info and 10/7/99 info
No 2.10 Uninsufficient geologic support in form of X-sections w/ correlations in area on both structural and stratigraphic data lines, and log analysis

OK 2.11 - No wells within 1/2 mile at this time.

9/24/99 info
No 2.12 No such affidavit provided.



Fed F-2 SWD

| Psur(psig) | R(bpm) | Pcht(psig) | Pinc(psig) | Pbh(psig) | Phyd(psig) |
|------------|--------|------------|------------|-----------|------------|
| 70.98 | 1.069 | 1 | 56.49 | 2500.19 | 2485.7 |
| 242.3 | 1.712 | 1.83 | 103.3767 | 2624.623 | 2485.7 |
| 342.6 | 2.064 | 2.56 | 144.6144 | 2683.686 | 2485.7 |
| 433.6 | 2.573 | 3.8 | 214.662 | 2704.638 | 2485.7 |
| 526.9 | 3.149 | 5.5 | 310.695 | 2701.905 | 2485.7 |
| 597.7 | 3.533 | 6.7 | 378.483 | 2704.917 | 2485.7 |
| 701.4 | 4.072 | 9 | 508.41 | 2678.69 | 2485.7 |
| 783.2 | 4.482 | 10.8 | 610.092 | 2658.808 | 2485.7 |

assumptions:

Fluid = 2% KCl @ 1.014 sp gr & 8.462 #/gal mud weight

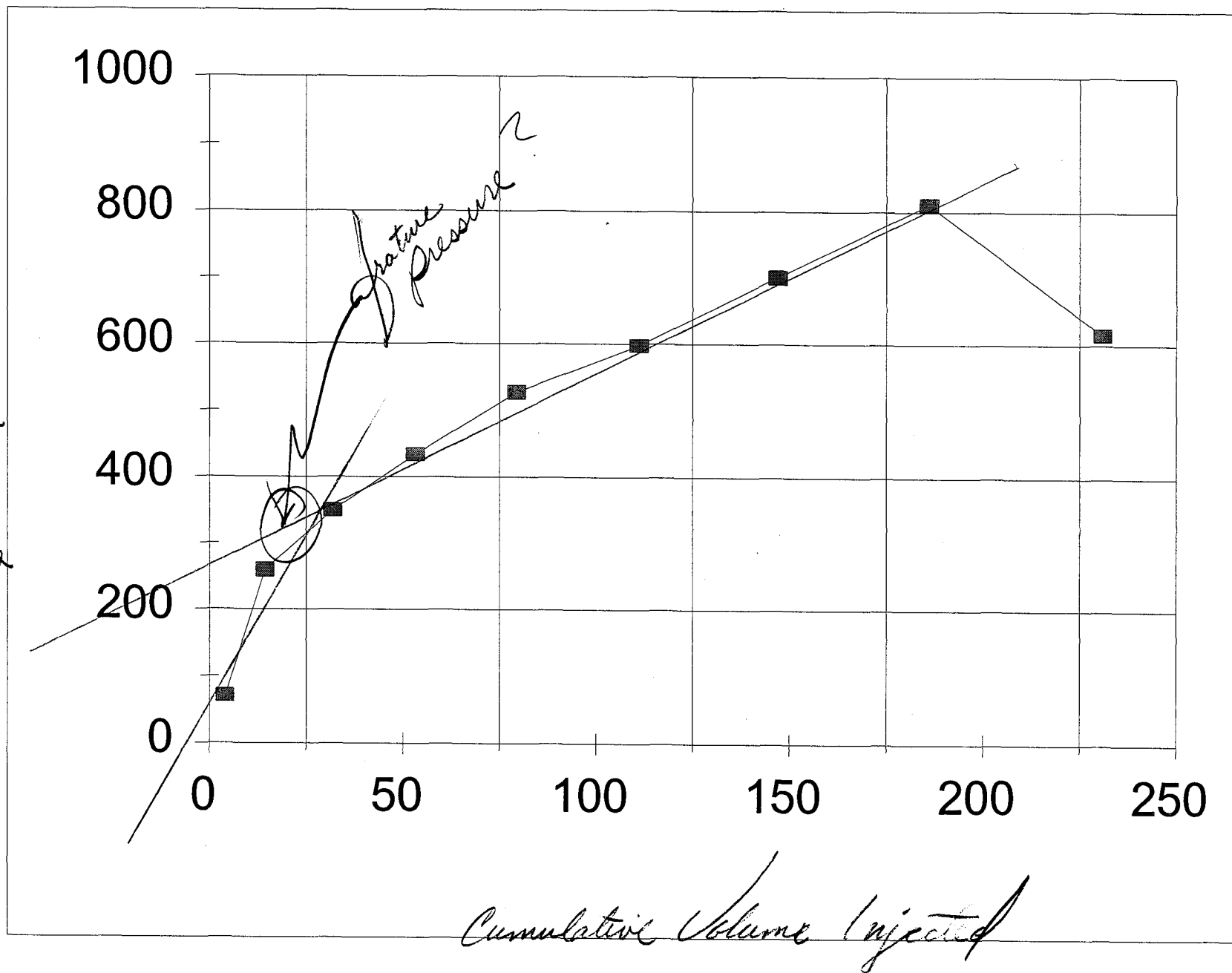
$$P_{bh} = (P_{sur} + P_{hyd}) - P_{fric}$$

when:

$$P_{hyd} = 5,649' * 0.052 * 8.462 \text{ #/gal} = 2,485.7 \text{ psig}$$

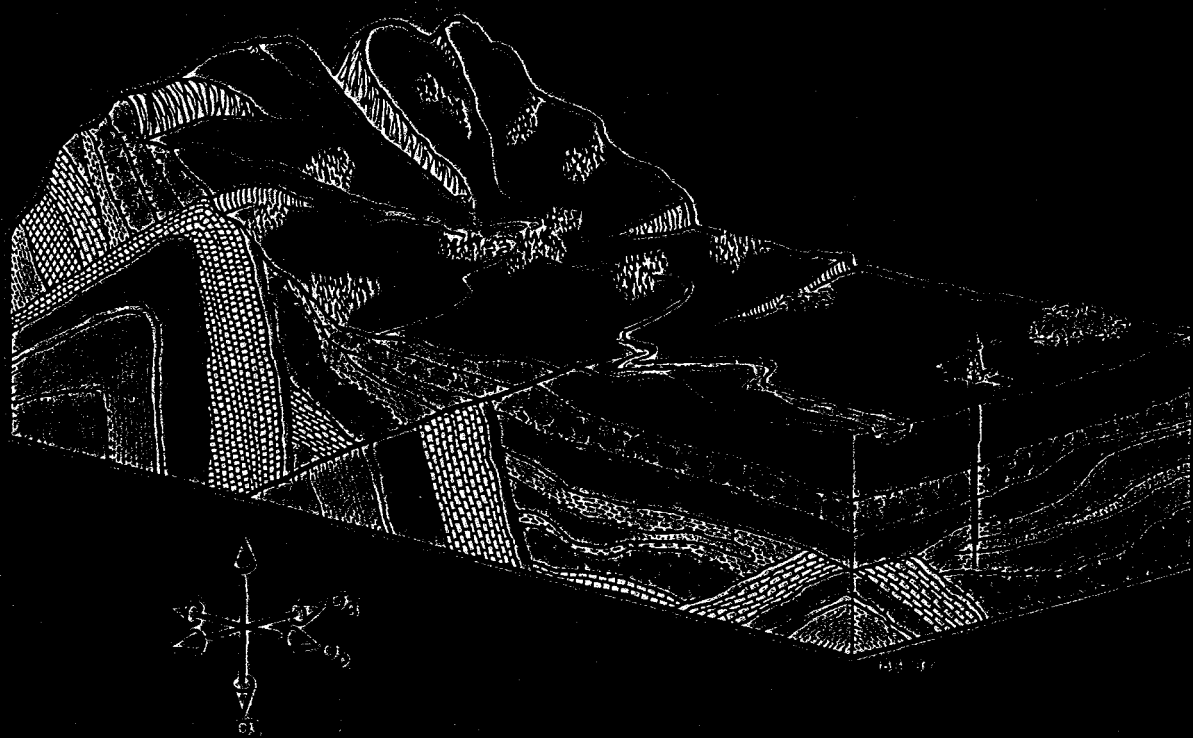
$$P_{fric} = 56.49 * P_{cht} \text{ multiplier}$$

Surface
Pressure



THEORY AND EVALUATION OF FORMATION PRESSURES

THE PRESSURE LOG
REFERENCE MANUAL



EKLOG

EDITION 1970
WISCONSIN

TECHNICAL MANUAL

It can be seen that in shallow, unconsolidated sediments with high water content, normally encountered offshore, fracture pressures can vary from overburden magnitudes in wet clays to only a little more than the pore pressure in unconsolidated sands.

A typical fracture-test plot is shown in Figure 5-6. The linear portion of the curve, AB, indicates elastic properties: pressure increase (stress) is directly proportional to volume pumped (strain). At point B, the pressure within the borehole is equal to the pore pressure plus the total minimum horizontal effective stress. All cracks, joints and partings within the section of borehole that is being tested, that lie on a vertical plane normal to this minimum horizontal stress, now have no compressional forces holding them closed. From B to C, the stress/strain proportionality no longer exists, such that for unit stress a greater proportion of strain is produced. The pressure difference, C - B, is that pressure necessary to push fluid into the cracks, apply pressure to the walls, and to apply pressure to the leading edge (close

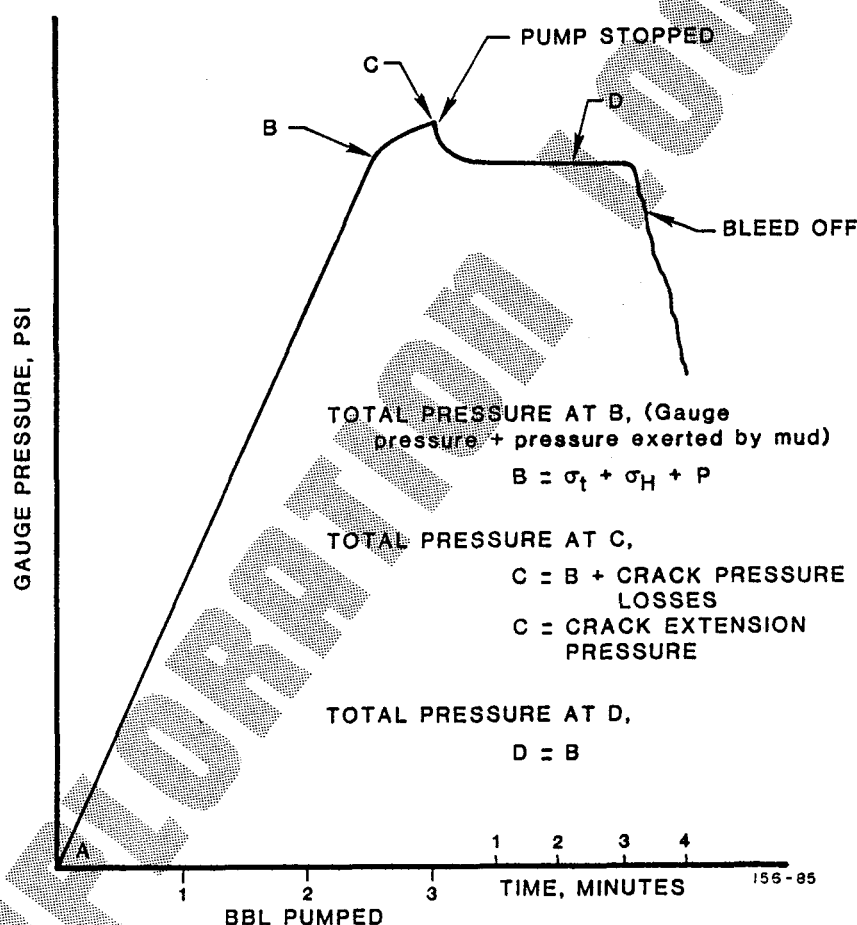


Figure 5-6. Typical fracture-test plot, showing the point at which the minimum horizontal stress becomes balanced by the total pressure within the borehole (B). If $B=D$, then the volume of mud returned on bleed-off should be equal to the initial volume pumped



October 7, 1999

Chris Kierst
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1220
Salt Lake City, UT 84114

**Reference: Helper Federal F-2 SWD
Section 8-T14S-R10E
Carbon County, Utah**

Dear Mr. Kierst:

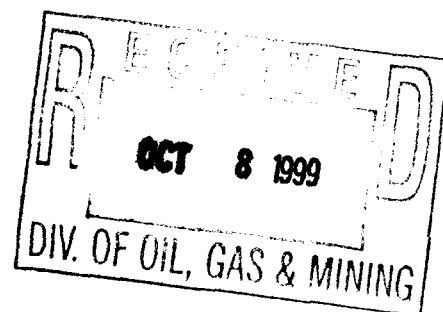
Please find enclosed the Navajo structure map that you requested. We were only able to find five control points that are currently available. If you have any questions regarding our interpretation please feel free to contact Keith Buck at (281) 873-1319. Keith is the geologist working on this project.

Anadarko appreciates your efforts in reviewing our application. Should you require any additional information, please contact me at (281) 873-1227.

Sincerely,

Shad Frazier
Engineer

SF
Enclosure



BEFORE THE DIVISION OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
STATE OF UTAH

---ooOoo---

| | | |
|--------------------------------|---|-------------------|
| IN THE MATTER OF THE | : | NOTICE OF AGENCY |
| APPLICATION OF ANADARKO | : | ACTION |
| PETROLEUM CORPORATION FOR | : | |
| ADMINISTRATIVE APPROVAL OF | : | CAUSE NO. UIC-243 |
| THE FEDERAL F-2 SWD WELL | : | |
| LOCATED IN SECTION 8, | : | |
| TOWNSHIP 14 SOUTH, RANGE | : | |
| 10 EAST, SE SE, S.L.M., CARBON | : | |
| COUNTY, UTAH, AS A CLASS II | : | |
| INJECTION WELL | : | |

---ooOoo---

THE STATE OF UTAH TO ALL PERSONS INTERESTED IN THE ABOVE ENTITLED
MATTER.

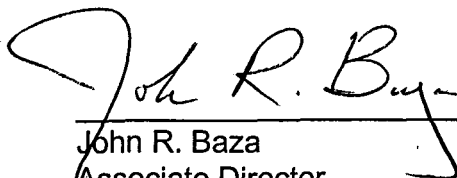
Notice is hereby given that the Division of Oil, Gas and Mining (the "Division") is commencing an informal adjudicative proceeding to consider the application of Anadarko Petroleum Corporation for administrative approval of the Federal F-2 SWD well, located in Section 8, Township 14 South, Range 10 East, SE SE, S.L.M., Carbon County, Utah, for conversion to a Class II injection well. The proceeding will be conducted in accordance with Utah Admin. R.649-10, Administrative Procedures.

The interval from 5649 feet to 6155 feet (Navajo Sandstone, Kayenta Sandstone & Wingate Sandstone Formations) will be selectively perforated for water injection. The maximum requested injection pressure is 1400 PSIG.

Any person desiring to object to the application or otherwise intervene in the proceeding, must file a written protest or notice of intervention with the Division within fifteen days following publication of this notice. If such a protest or notice of intervention is received, a hearing will be scheduled before the Board of Oil, Gas and Mining. Protestants and/or intervenors should be prepared to demonstrate at the hearing how this matter affects their interests.

Dated this 1st day of October, 1999.

STATE OF UTAH
DIVISION OF OIL, GAS & MINING



John R. Baza
Associate Director

**Anadarko Petroleum Corporation
Federal F-2 SWD Well
Cause No. UIC-243**

Publication Notices were sent to the following:

Anadarko Petroleum Corporation
17001 Northchase Drive
Houston, Texas 77060

SENT VIA E-MAIL AND FAX
Newspaper Agency Corporation
Legal Advertising
P.O. Box 45838
Salt Lake City, Utah 84145

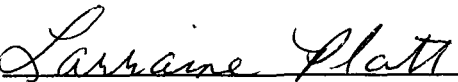
Sun Advocate
P.O. Box 870
845 East Main
Price, Utah 84501-0870

Moab District Office, BLM
82 East Dogwood
Moab, Utah 84532

Price Field Office, BLM
125 South 600 West
Price, Utah 84501

Dave Levanger
Director of Planning
Carbon County Courthouse
120 East Main Street
Price, Utah 84501

U.S. Environmental Protection Agency
Region VIII
Attn. Dan Jackson
999 18th Street
Denver, Colorado 80202-2466


Larraine Platt
Secretary
October 1, 1999













INJECTION WELL - PRESSURE TEST

| | | | |
|---|---------------------------------|------------------------|--------------------------|
| Well Name: <u>FEDERAL F-2 SWD</u> | API Number: <u>43-007-30555</u> | | |
| Qtr/Qtr: <u>SE/SE</u> | Section: <u>8</u> | Township: <u>14S</u> | Range: <u>10E</u> |
| Company Name: <u>ANADARKO PETROLEUM CORPORATION</u> | | | |
| Lease: State <u> </u> | Fee <u> </u> | Federal <u>X</u> | Indian <u> </u> |
| Inspector: <u>J THOMPSON</u> | | Date: <u>11/15/99.</u> | |
| | | | |
| | | | |

Initial Conditions:

Tubing - Rate: Pressure: psiCasing/Tubing Annulus - Pressure: 1400 psi

Conditions During Test:

| Time (Minutes) | Annulus Pressure | Tubing Pressure |
|----------------|---|---|
| 0 | <u>1400</u> | <u>0</u> |
| 5 |  |  |
| 10 |  |  |
| 15 |  |  |
| 20 |  |  |
| 25 |  |  |
| 30 |  |  |

Results: Pass/Fail

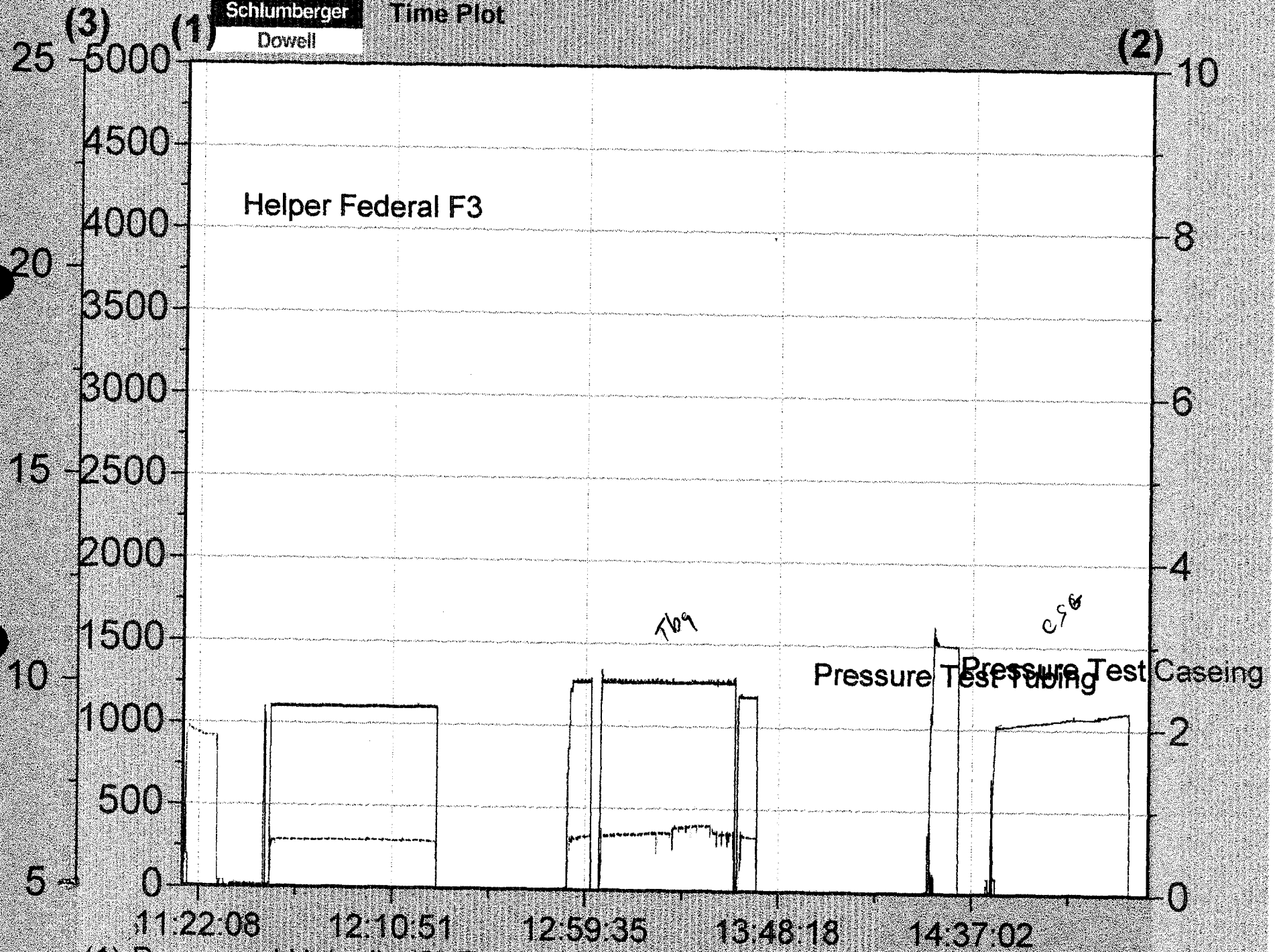
Conditions After Test:

Tubing Pressure: 0 psiCasing/Tubing Annulus Pressure: 1400 psiCOMMENTS: 40° Water KCL. 2 BBL Diesel frize blank.
Held pressure since 11/15/99.
Operator Representative

Schlumberger
Dowell

PRISM*
Time Plot

Helper Federal F3



(1) Pressure U1 (psi) (2) TotFlowrate (bpm) (3) Density (ppg) *Mark of Schlumberger

DIVISION OF OIL, GAS AND MINING
UNDERGROUND INJECTION CONTROL PROGRAM

**PERMIT
STATEMENT OF BASIS**

Applicant: Anadarko Petroleum Corporation

Well: Federal F-2 SWD

Location: T14S, R10E, S8, Carbon Co., UT

API: 4300730555

Ownership Issues:

The well is located on surface and mineral estates owned by the United States of America and administered by the Bureau of Land Management. Affidavit of notification of surface owners within a half mile radius have been provided as attached Exhibit "D" in the the operator's supplemental required documentation submission of 9/24/99.

Well Integrity:

20" conductor pipe installed from 0' to 13' and grouted. 13-3/8", 48#/ft. surface casing, installed from 0' to 317' using 340 sacks of Class G (15.6 ppg) cement circulated to surface. . 8-5/8", 24#/ft., J-55 STC intermediate casing, installed from 0' to 2,285' using 750 sacks lead/250 sacks tail of Hal-Lite (12.7#/gal) and Class G (15.6#/gal). 70 barrels of cement was reported circulated. An injection string of 5-1/2", 15.5#/ft. K-55 LTC was installed from 0' to 6,200' using 200 sacks lead/420 sacks tail of Hal-Lite (12.7#/gal) and 50/50 Poz (14.4#/gal) yielding an estimated TOC @ 1,800'. A DV tool was placed @ 5,020'. A Cement Bond Log was run from 6,160' to 1,900'. The cement appears to be bonded an average of ~97% over the injection interval and generally appears well bonded for over 300' above the top most injection zone. This should be adequate to prevent any upward migration of fluid between the 5 1/2" casing and the borehole wall. The 5 1/2" casing was perforated in the Navajo Sandstone, Kayenta Formation and Wingate Sandstone in a gross interval from 5,649' to 6,155' and a Step Rate injection test was run on 8/11/99. A proper Mechanical Integrity Test must be run prior to issuing a permit.

Ground Water Protection:

There are no aquifers with high-quality ground water expected to be encountered in the thin, clayey slope wash covering the Blue Gate Shale Member of the Mancos Formation. Conductor, surface and intermediate casing have been set and cemented in place and will adequately protect the shallow alluvial sediments. The 13-3/8" casing string's cement was circulated back to surface. The TOC for the injection string was calculated to be ~1,800'. Other subsurface water is

unlikely between the surface alluvium and the Cretaceous-age Ferron Sandstone Member of the Mancos Shale. The Ferron Sandstone Member including the coal seams provides the field produced (and injected) water. The Ferron Sandstone Member is found at ~1,490' of depth in the Federal F-2 well and in nearby production wells, its co-mingled formation waters were analyzed to contain average total dissolved solids (TDS) of 16,176 mg/l.

On August 11, 1999 the upper Navajo Sandstone formation water from the subject well was tested at 37,504 mg/l TDS on analysis by NALCO / EXXON ENERGY CHEMICALS, L.P. The lower Navajo Sandstone provided water samples which were tested at 62,446 mg/L TDS and Wingate Sandstone samples tested at 76,706 mg/L TDS. The Navajo Sandstone is a known fresh water aquifer at many locations in the state. In the San Rafael Swell area, the quality of Navajo Sandstone ground water is generally best near the outcrop and recharge areas and poorer with increased depth and distance from recharge [Utah State Department of Natural Resources (DNR) Technical Publication # 78]. This premise has been supported by test results on samples taken from the subject well and other disposal wells in the field. The planned injection of Ferron Sandstone Member produced formation water into the specified formations at this location will result in the dilution of the more saline Navajo Sandstone formation water.

The proposed operation is expected to have little effect on the overall hydrology of the aquifer because of its great extent compared to the volume of fluid that will likely be injected. According to DNR Technical Publication #78, the Navajo Sandstone alone contains approximately 94,000,000 acre-feet of water in transient storage. The operator seeks a permit for an unlimited injection rate at a maximum injection pressure of 1,400 psig. This pressure limit will likely limit the injection rate to below 7 barrels per minute (10,080 barrels per day). For comparison, 14,400 barrels per day for 10 years would result in approximately 6,775 acre-feet being injected. This equates to about 0.007% of the water already in storage in the Navajo Sandstone and would require at least 143 disposal wells working round the clock for 10 years to inject 1% of the stored volume in the Navajo Sandstone. During a step rate test conducted in this well on August 11, 1999, Schlumberger Dowell, Inc., measured the apparent formation parting pressure at ~2,700 psi (~300 psig) during a pump rate at ~2 barrels per minute at a depth of 5,649'. Information previously submitted to the Division suggests that fracture propagation occurs in a downward direction in the Navajo Sandstone. This is controlled, in part, by two zones of impermeable Carmel Formation anhydrite which overlie the Navajo Formation, thereby affording a seal and the upper bounding beds of the injection zone. The study indicates that at that location the operator could inject with surface pressures exceeding the Navajo Sandstone parting pressure without causing a breach in the anhydrite bounding beds above the injection zone.

After reviewing the information submitted by Anadarko Petroleum Corporation to technically support the application, it is our conclusion that injection into the

Navajo and Wingate Sandstones at this location would result in some dilution of the saline water present in the aquifer, and that a pressure increase near the well bore, created by injection of fluids, would eventually dissipate after the cessation of injection. No long term negative impacts are anticipated as a result of injection of produced water into the subject well.

Oil/Gas & Other Mineral Resources Protection:

The Ferron coal/gas zone is protected by casing and cement which has been reviewed in the Well Integrity portion of this report. No other known potentially producible mineral or hydrocarbon zones were encountered by the well. The injection zone is isolated nearly 4,000' below the productive interval of the Ferron Sandstone.

A review of the well records of the Division of Oil, Gas and Mining for the half mile area of review indicated that there were no existing well bores within a half mile of the proposed disposal well other than shallower Ferron Sandstone production wells.

Bonding:

Anadarko Petroleum Corporation has placed a \$125,000 nation-wide bond in the custody of the Bureau of Land Management.

Actions Taken and Further Approvals Needed:

Notice of this application was published in the Salt Lake Tribune and The (Price, UT) Sun Advocate. In addition, copies of the notice were provided to the EPA, BLM (Price, UT, Field and Moab, UT, District Offices), Carbon County Planning Office, and Anadarko Petroleum Corporation. The notice stated the proposed interval for injection spanned the Navajo Sandstone to the Wingate Sandstone, inclusive, through selected perforations from 5,649' to 6,155'.

A properly designed and constructed injection well, combined with periodic mechanical integrity tests, poses no threat to fresh or useable groundwater supplies. The Division staff recommends approval of this application at a prudent maximum bottom hole pressure of 2,680 psi (234 psig), contingent upon no additional or unforeseen information being presented which will change this analysis or the data presented herein. The Division would welcome additional technical submissions supporting the prudence of a higher maximum injection pressure if Anadarko Petroleum Corporation considers it warranted. A successful Mechanical Integrity Test of the injection system will be required prior to granting of final approval to inject.

Reviewer: Christopher Kierst

Date: October 27, 1999

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

CONFIDENTIAL

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, deepen existing wells, or to reenter plugged and abandoned wells.
Use APPLICATION FOR PERMIT TO DRILL OR DEEPEN form for such purposes

1. Type of Well: OIL ☐ GAS ☐ OTHER: coalbed methane

2. Name of Operator

Anadarko Petroleum Corporation

3. Address and Telephone Number.

17001 Northchase Dr., Houston, Texas 77060

(281) 874-8766

4. Location of Well

Footages:

QQ, Sec., T., R., M.:

14S 10E 8 43007 30555

County:

State:

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

NOTICE OF INTENT
(Submit in Duplicate)

- | | |
|--|---|
| <input type="checkbox"/> Abandon | <input type="checkbox"/> New Construction |
| <input type="checkbox"/> Repair Casing | <input type="checkbox"/> Pull or Alter Casing |
| <input type="checkbox"/> Change of Plans | <input type="checkbox"/> Recomplete |
| <input type="checkbox"/> Convert to Injection | <input type="checkbox"/> Perforate |
| <input type="checkbox"/> Fracture Treat or Acidize | <input type="checkbox"/> Vent or Flare |
| <input type="checkbox"/> Multiple Completion | <input type="checkbox"/> Water Shut-Off |
| <input type="checkbox"/> Other _____ | |

Approximate date work will start _____

SUBSEQUENT REPORT
(Submit Original Form Only)

- | | |
|--|---|
| <input type="checkbox"/> Abandon* | <input type="checkbox"/> New Construction |
| <input type="checkbox"/> Repair Casing | <input type="checkbox"/> Pull or Alter Casing |
| <input type="checkbox"/> Change of Plans | <input type="checkbox"/> Perforate |
| <input type="checkbox"/> Convert to Injection | <input type="checkbox"/> Vent or Flare |
| <input type="checkbox"/> Fracture Treat or Acidize | <input type="checkbox"/> Water Shut-Off |
| <input checked="" type="checkbox"/> Other _____ | Weekly Reports |

Date of work completion _____

Report results of **Multiple Completions** and **Recompletions** to different reservoirs on WELL COMPLETION OR RECOMPLETION REPORT AND LOG form.

* Must be accompanied by a cement verification report.

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

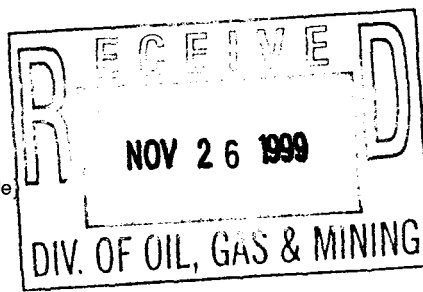
Weekly Reports for the Helper Field (week ending 11-19-99)

Wells: Helper Federal F-2 SWD, B-6, B-7, B-9, D-2, D-8, E-2, H-2, H-2, Chubbuck A-2, State A-16

13. Name & Signature Judy Davidson Title Regulatory Analyst

Date 11-19-99

(This space for State use only)



ANADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.

CONFIDENTIAL

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

07/07/1999 MIRU - SET 20" CONDUCTOR @ 13', GROUT SAME, SPUD @ 0800 HRS 06 JULY 1999, DRLG F/ 13-320 W/ HAMMER BIT, POOH, RIH W/ 7 JTS 13-3/8" 48# CSG, SET CSG @ 317, CMT W/ 340 SX @ 15.6 PPG, CIRC 32 BBLs CMT, LAST SURVEY @ N/A, MW 8.6 PPG, CC 65,000. RPT #1

07/08/1999 WOC, CUT CSG, NU BOPE, TEST SAME, RIH, D/O CMT 277-320, AIR DRLG F/ 320-442, LAST SURVEY @ 400-0.5°, CC 86,890. RPT #2

07/09/1999 AIR DRLG F/ 442-1477, LAST SURVEY MISS RUN, CC 96,397. RPT #3

07/10/1999 AIR DRLG F/ 1477-2271, CCH @ 2154 & 2185, LAST SURV MISS RUN, CC 107,617. RPT #4

07/11/1999 AIR DRLG F/ 2271-2285, CC F/ LOGS, SHORT TRIP, POOH, RIH W/ LOGS - LOGS STOPPED @ 2080, R/D LOGGERS, MIX MUD, RIH W/ MULTISHOT, DISP W/ MUD, W&R F/ 2075-2180, LAST SURV @ 2121-4.65°, CC 122,003. RPT #5

07/12/1999 W&R F/ 2180-2285, CCM, SHORT TRIP, POOH, RIH W/ LOGS, LOG WELL, R/D LOGGERS, RIH, CCM, POOH, RIH W/ 8-5/8" 24# CSG, LAST SURV @ 2121-4.65°, CC 133,780. RPT #6

07/13/1999 RIH W/ 51 JTS 8-5/8" 24# CSG, WASH 10' TO BTM, SET CSG @ 2285, CCM, CMT W/ 755 SX LEAD @ 12.7 PPG & 250 SX TAIL @ 15.6 PPG, DISP, CIRC 70 BBL CMT TO SURF, BUMP PLUG, FLOATS DID NOT HOLD, SI & HELD PRESS 4 HRS, CUT CSG, INSTALL B SECTION, NU BOP, TEST BOP, RIH, LAST SURV @ 2121-4.65°, CC 184,487. RPT #7

07/14/1999 RIH, D/O CMT & FS, DRILL 10', FIT 10 PPG EMW, DRLG F/ 2295-2497, C&C TIGHT HOLE @ 2497, DRLG F/ 2497-2964, LAST SURV @ 2466-4.25°, CC 194,411. RPT #8

07/15/1999 DRLG F/ 2964-3334, TFB 3 @ 3334 - TIGHT HOLE, LAST SURV @ 3254-5.0°, CC 204,958. RPT #9

07/16/1999 TIH W/ BIT 3, W&R 2570-2664 & 2839-3210 & 3300-BTM, DRLG F/ 3334-3597, LAST SURVEY @ 3254-5.0°, CC 221,832. RPT #10

07/17/1999 DRLG F/ 3597-3954, LAST SURV @ 3570-5.25°, MW 9.0 PPG, CC 233,761. RPT #11

07/18/1999 DRLG F/ 3954-4226, TFB 5 @ 4226, LAST SURV @ 4151-4.75°, MW 9.1 PPG, CC 249,303. RPT #12

07/19/1999 DRLG F/ 4226-4422, TRIP F/ MTR @ 4408, LAST SURV @ 4333-5.0°, MW 9.1 PPG, CC 258,609. RPT #13

07/20/1999 DRLG F/ 4422-4800, LAST SURV @ 4333-5.0°, MW 9.0 PPG, CC 269,570. RPT #14

07/21/1999 DRLG F/ 4800,-5096, TFB 6 @ 5096, LAST SURV @ 5021-5.5°, MW 9.0 PPG, CC 279,982. RPT #15

07/22/1999 DRLG F/ 5096-5473, LAST SURV @ 5021-5.5°, MW 9.1 PPG, CC 295,041. RPT #16

07/23/1999 DRLG F/ 5473-5922, TFB 7 @ 5922, LAST SURV @ 5021-5.5°, MW 9.1 PPG, CC 306,854. RPT #17

07/24/1999 TIH, TOO, LD MTR & 1 DC, PU MTR, RIH, DRLG F/ 5922-5999, LOST CIRC, MIX & SPOT 20 BBL PILL, POOH 5 STANDS, MIX MUD & BUILD VOLUME, LAST SURV @ 5855-2.25°, MW 9.4 PPG, CC 323,688. RPT #18

07/25/1999 REGAIN CIRC, DRLG F/ 5999-6190, LOST CIRC, SPOT LCM PILL, DRLG F/ 6190-6200 (TD) W/ PARTIAL RETURNS, SPOT LCM PILL ON BTM, SHORT TRIP, CCM, POOH, LOG WELL, LOGGER TD 6197, LAST SURV @ 5855-2.25°, MW 9.1 PPG, CC 336,072. RPT #19

07/26/1999 FINISH LOGS, RIH, CCM, POOH LDDP, RIH W/ 144 JTS 5-1/2" 15.5 # K55 CSG, SET CSG @ 6200. CMT 1ST STAGE, OPEN DV TOOL, CCM FOR 2ND STAGE, LAST SURV @ 5855-2.25°, MW 9.1 PPG, CC 389,220. RPT #20

07/27/1999 CMT 2ND STAGE W/ 420 SX, BUMP PLUG, FLOATS HELD, ND BOP, SET SLIPS, CUT CSG, CLEAN PITS, RLS RIG @ 1200 HRS 26 JULY 1999, LAST SURV @ 5855-2.25°, MW 9.1 PPG, CC 414,408. RPT #21 - **TEMP DROP FROM REPORT** -

08/01/1999 PBTD 4970 (NAVAJO) MIRUPU, INSTALL TBG HEAD, TIH W/ 4 3/4" BIT AND TBG, SDFN, CC 418,350.

08/02/1999 PBTD 5022 (NAVAJO) TIH W/ TBG, TAG CMT @ 4970, DO 4970-5022 DO DV TOOL, TIH W/ ONE JT, SWI, SDFN, CC 422,550.

ANADARKO PETROLEUM CORPORATION
WELL HISTORY
ONSHORE - U.S.

CONFIDENTIAL

FEDERAL F-2 SWD, HELPER FIELD, 1201' FSL & 840' FEL, SEC 8-14S-10E, CARBON CO., UT, WI 1.0000, NRI NA, AFE #18613, ETD 6,200', GLE 5659' (NAVAJO SANDSTONE), UNION RIG #17. API #43-007-30555

08/03/1999 PBTD 6165 (NAVAJO) TIH W/ 33 JTS, TAG 6104', DO CMT FROM 6104-6165, CIRC HOLE WITH 2% KCL, POOH W/ TBG, CC 427,420.

08/04/1999 PBTD 6165 (NAVAJO) RIH W/ 4.63" GR TO 6163, RAN GR/CBL/CCL, TOC 2108, PRESS CSG TO 4000 - OK, **PERF 6143-55, 6072-6116 (NAVAJO)** W/ 4 SPF, 22.7 GRM, 0.37" DIAM, 90 DEG PH, TIH W/ PKR & 189 JTS TBG, SET PKR @ 6038, SDFN, CC 437,200.

08/05/1999 PBTD 6165 (NAVAJO) MIRU SU, SWAB 58 BW, RD SU, POOH W/ TBG AND PKR, RU WL, SET RBP @ 6040, FILL CASING W/ 2% KCL, PRESSURE TEST RBP TO 1000 PSI-OK, DMP BAIL 2 SKS SAND ON RBP, SDFN CC 440,100.

08/06/1999 PBTD 6165 (NAVAJO) MIRUWL, **PERF 5958-98, 5838-5950**, RDMOWL, RIH W/ PKR AND TBG, SET PKR @ 5815, RUSU, SWAB 79 BW, SDFN, CC 451,600.

08/07/1999 PBTD 6165 (NAVAJO) SWAB WELL, CAUGHT FL SAMPLE, REL PKR, POOH, RU WL, TIH W/ RBP SET @ 5830, TEST RBP TO 1000-OK, SDFN, CC 453,950.

08/08/1999 PBTD 6165 (NAVAJO), RUWL, PERF NAVAJO, 5720-5820, 5649-5710, RDMOWL, TIH W/ PKR AND TBG, SET PKR @ 5594, RU SWAB, SWAB 78 BW, SDFN, CC 465,900.

08/09/1999 PBTD 6165 (NAVAJO), SI, CC 465,900.

08/10/1999 PBTD 6165 (NAVAJO), SWAB 10 RUNS, REL PKR, POOH W/ PKR, TIH W/ TBG, TAG RBP @ 5830, CIRC SAND AND RETR RBP, POOH W/ RBP, TIH W/ TBG AND RETR HEAD, LEFT AT 5594, SIWFN, CC 472,500.

08/11/1999 PBTD 6165 (NAVAJO), TIH W/ TBG, TAG RBP @ 5998, CIRC CLEAN, LATCH RBP, POOH W/ RBP, TIH W/ TBG AND PKR, SET PKR @ 5594, RU PMP TRK BD W/ 10,500 GALS OF 2% KCL, AIR 8.2 BPM @ 2090, ISIP 215, CC 475,100.

08/12/1999 PBTD 6165 (NAVAJO), STEP RATE TEST, PMPD 339 BW, REL PKR, POOH LD TBG, NDBOPE, NUWH, SWI, RDMOPU. CC 484,200.

08/13/1999 NO REPORT. - **TEMP DROP FROM REPORT** -

11/12/1999 PBTD 6165 (NAVAJO), NDWH, NU BOP, RIH W/ BAKER TOOL 5 1/2" COATED LOCK SET PKR W/L-10, W/ STAINLESS STEEL 1.87 FWG PLUG IN PLACE, 10 JTS FIBERGLASS LINED TBG AND 22 JTS PLASTIC LINED TBG, RIH W/1.91 DRIFT, POOH W/SAME, RIH 85 TOTAL JTS, SDFN, CC 487,700.

11/16/1999 PBTD 6165 (NAVAJO), NR, CC 487,700 --**DROP FROM REPORT**--



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

December 7, 1999

Anadarko Petroleum Corporation
17001 Northchase Drive
P. O. Box 1330
Houston, Texas 77251-1330

Re: Federal F-2 SWD, 4300730555, Section 8, Township 14 South, Range 10 East, Carbon County, Utah

Gentlemen:

Pursuant to Utah Admin. Code R649-5-3-3, the Division of Oil, Gas and Mining (the "Division") issues its administrative approval for conversion of the referenced well to a Class II injection well. Accordingly, the following stipulations shall apply for full compliance with this approval:

1. Compliance with all applicable requirements for the operation, maintenance and reporting for Underground Injection Control ("UIC") Class II injection wells pursuant to Utah Admin. Code R649-1 et seq.
2. Conformance with all conditions and requirements of the complete application submitted by Anadarko Petroleum Corporation.

If you have any questions regarding this approval or the necessary requirements, please contact Christopher Kierst at this office.

Sincerely,

John R. Baza
Associate Director, Oil and Gas

lwp

cc: Dan Jackson, Environmental Protection Agency
Carbon County Commission



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Kathleen Clarke
Executive Director

Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210

PO Box 145801

Salt Lake City, Utah 84114-5801

801-538-5340

801-359-3940 (Fax)

801-538-7223 (TDD)

UNDERGROUND INJECTION CONTROL PERMIT

Cause No. UIC-243

Operator: Anadarko Petroleum Corporation

Wells: Federal F-2 SWD

Location: Section 8, Township 14 South, Range 10 East,
County: Carbon

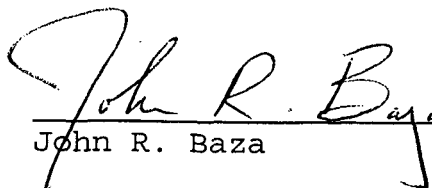
API No.: 43-007-30555

Well Type: Disposal

Stipulations of Permit Approval

1. Approval for conversion to Injection Well issued on December 7, 1999
2. Maximum Allowable Injection Pressure: 234 psig
3. Maximum Allowable Injection Rate: Restricted by pressure limitation.
4. Injection Interval: 5,649 feet to 6,155 feet (Navajo Sandstone and Wingate Sandstone)

Approved by:


John R. Baza

12/7/99
Date



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Kathleen Clarke
Executive Director

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Division Director

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December 7, 1999

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17001 Northchase Drive
P. O. Box 1330
Houston, Texas 77251-1330

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If you have any questions regarding this approval or the necessary requirements, please contact Christopher Kierst at this office.

Sincerely,

John R. Baza
Associate Director, Oil and Gas

lwp

cc: Dan Jackson, Environmental Protection Agency
Carbon County Commission



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
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PO Box 145801

Salt Lake City, Utah 84114-5801

801-538-5340

801-359-3940 (Fax)

801-538-7223 (TDD)

UNDERGROUND INJECTION CONTROL PERMIT

Cause No. UIC-243

Operator: Anadarko Petroleum Corporation

Wells: Federal F-2 SWD

Location: Section 8, Township 14 South, Range 10 East,
County: Carbon

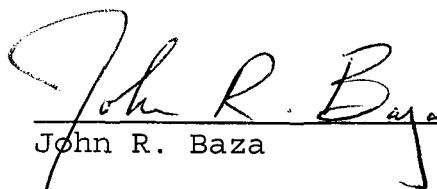
API No.: 43-007-30555

Well Type: Disposal

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Approved by:


John R. Baza

12/7/99
Date

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

| | | |
|--|--|---|
| SUNDRY NOTICES AND REPORTS ON WELLS Do not use this form for proposals to drill new wells, deepen existing wells, or to reenter plugged and abandoned wells. Use APPLICATION FOR PERMIT TO DRILL OR DEEPEN form for such purposes | | 5. Lease Designation and Serial Number UTU-65762 |
| | | 6. Indian, Allottee or Tribe Name: |
| | | 7. Unit Agreement Name: |
| 1. Type of Well: OIL <input type="checkbox"/> GAS <input type="checkbox"/> OTHER: Salt Water Disposal | | 8. Well Name and Number: Federal F-2 SWD |
| 2. Name of Operator Anadarko Petroleum Corporation | | 9. API Well Number: 43-007-30555 |
| 3. Address and Telephone Number. 17001 Northchase Dr., Houston, Texas 77060 | | 10. Field and Pool, or Wildcat Helper |
| 4. Location of Well Footages: 1201' FSL & 840' FEL QQ, Sec., T., R., M.: Section 8-T14S-R10E | | |

County: Carbon
State: UT

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

| NOTICE OF INTENT (Submit in Duplicate) | SUBSEQUENT REPORT (Submit Original Form Only) |
|---|---|
| <input type="checkbox"/> Abandon <input type="checkbox"/> Repair Casing <input type="checkbox"/> Change of Plans <input type="checkbox"/> Convert to Injection <input type="checkbox"/> Fracture Treat or Acidize <input type="checkbox"/> Multiple Completion <input checked="" type="checkbox"/> Other: Request for increase in max injection pressure. | <input type="checkbox"/> Abandon* <input type="checkbox"/> Repair Casing <input type="checkbox"/> Change of Plans <input type="checkbox"/> Convert to Injection <input type="checkbox"/> Fracture Treat or Acidize <input type="checkbox"/> Other: |
| <input type="checkbox"/> New Construction <input type="checkbox"/> Pull or Alter Casing <input type="checkbox"/> Recomplete <input type="checkbox"/> Perforate <input type="checkbox"/> Vent or Flare <input type="checkbox"/> Water Shut-Off | <input type="checkbox"/> New Construction <input type="checkbox"/> Pull or Alter Casing <input type="checkbox"/> Perforate <input type="checkbox"/> Vent or Flare <input type="checkbox"/> Water Shut-Off |
| Approximate date work will start: As soon as approved | Date of work completion: _____ Report results of Multiple Completions and Recompletions to different reservoirs on WELL COMPLETION OR RECOMPLETION REPORT AND LOG form. * Must be accompanied by a cement verification report. |

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

See Attached.

A - Logs from F-2W211

B - X Section

C - Isopach map

D - structure map

E - Fracturing Report

Table 1 Data

RECEIVED

FEB 11 2000

DIVISION OF
OIL, GAS AND MINING

13. Name & Signature: [Signature] Title: Production Engineer Date: 01/25/00

(This space for State use only)

Injection Pressure Limit = 1350 psi

APPROVE THE STATE
OF UTAH DIVISION OF
OIL, GAS, AND MINING
DATE: 2-22-00
BY: [Signature]



February 8, 2000

Mr. Christopher J. Kierst
State Of Utah
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1220
Salt Lake City, UT 84114

**Reference: Helper Federal F-2 SWD
Carbon County, Utah**

Dear Mr. Kierst:

Enclosed in duplicate is a Sundry Notice (Form 9) for the above-referenced well. At this time we are currently requesting that the injection pressure limit for the above referenced well be increased from the current 280 psi to 1350 psi based upon the overlying beds providing adequate protection from invading fluids. All data to back up this request is attached.

Should you require any additional information, you can reach me at (281) 873-1227.

Sincerely,

Shad Frazier
Production Engineer

SMF/tsd
Enclosure

RECEIVED
FEB 11 2000
DIVISION OF
OIL, GAS AND MINING



February 8, 2000

Mr. Christopher J. Kierst
State Of Utah
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1220
Salt Lake City, UT 84114

**Reference: Helper Federal F-2 SWD
Carbon County, Utah**

Dear Mr. Kierst:

Anadarko Petroleum requests an increase in maximum allowable injection pressure for the above referenced well. We feel that the injection permit should be raised above the current 280 psi to 1350 psi. This value is based upon reservoir modeling that shows the Navajo formations leakoff and overlying anhydrite barriers are protecting the surface waters from all injected fluid.

Log Correlation

The lower Carmel anhydrite is an easily defined geological marker in the Unita basin. River Gas has submitted several studies of this reservoir feature when permitting the D-3 through the D-11 injection wells in their Drunkard's Wash Unit. They have correlated these anhydrite layers in the D-3 with gamma ray and bulk density curves to the rest of the injection wells in the field.

These layers are all defined by the very high bulk density readings and are identified in the Helper Federal F-2 SWD (Exhibit A). The first is 10' (5210-5230), second 10' (5290-5300), and the third is 26' (5364-5390).

A cross section (Exhibit B), isopach map (Exhibit C), and structure map (Exhibit D) are submitted to show how the anhydrite layer overlays the Navajo in the Unita basin. Table 1 was used for constructing these maps. The Anhydrite layers show continuity across the basin and provide an additional seal to injected fluids in the Navajo formation.

Reservoir modeling



A reservoir model has been designed using stress and rock properties River Gas submitted in their reports from STIMLAB dated September 20, 1996 and August 20, 1997. These reports were used for the permitting of the Drunkards Wash D-3 and are on record the Utah's Division of Oil, Gas, And Mining. River Gas's data from their reservoir model and dipole sonic log provided values for Young's modulus, Poisson's ratio, permeability, and closure stress for the corresponding layers and were used in our modeling efforts. The closure stress of the Navajo formation was calculated to 0.46 psi/ft. This value was attained from the step rate test already on file with the state for this well.

Our reservoir modeling work supports the previous work of River Gas that injection into the Navajo sand will not break through the Carmel anhydrite. The enclosed simulation report (Exhibit E) describes what pressures we would expect if we were to inject into the Navajo at rates of 1,3,5,10, and 15 BPM. The graph at the end of the report shows that at 15 BPM the surface pressure would exceed 13000 psi, close to the burst rating of the tubing. At 15 BPM the reservoir simulator predicts the frac height would not grow more than 168' above the center of the Navajo and would be contained within the formation.

Using the current limit of 1350 psi set by the Department of Oil Gas and Mining the fracture created through the injection of water (As seen in the Exhibit E graphs) would grow to no more than 70 feet from the center of the Navajo and be contained within the formation.

Conclusion

Our analysis shows that the Navajo sands have the capability to absorb injection water at pressures above 1350 psi without breaking into overlying barriers. The Anhydrite layers that do cover the entire area will act as a secondary barrier to excessive fracture height growth. Therefore, we request that the Department of Oil, Gas and Mining grant Anadarko Petroleum the ability to inject at 1350 psi in the Helper Federal F-2 SWD in Carbon, County, Utah. I would like the opportunity to review any questions you may have at your earliest convenience.

EXHIBIT A

APC
Federal F-2 SWD
Carbon County, Utah
4300730555
KB: 5674

EXHIBIT A

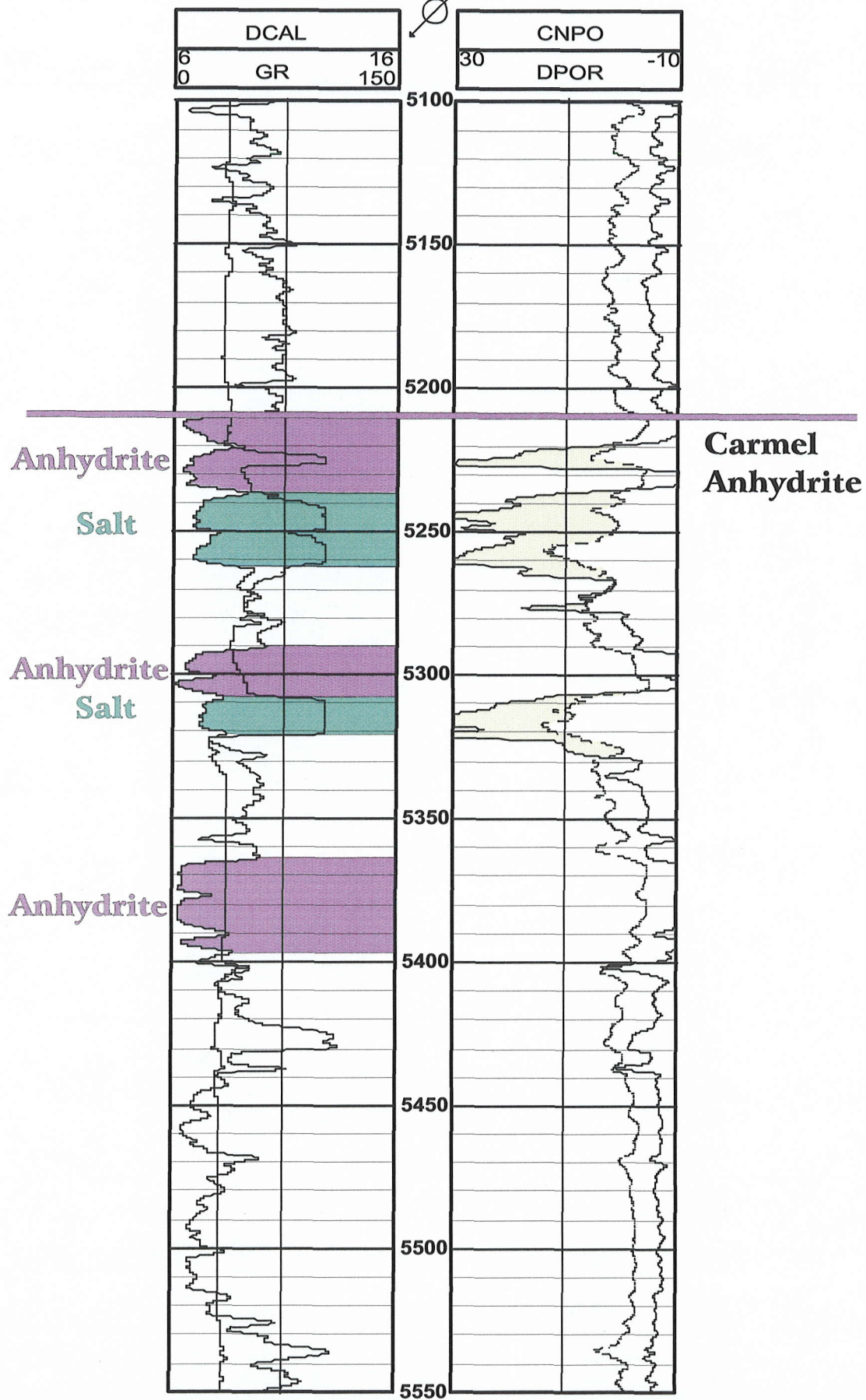


EXHIBIT E

Fracturing Report

Well Name: Helper Federal F-2 SWD 01/28/2000
Well Location: Sec 8-14S-10E Carbon County,
Formation Name: Navajo, Wingate
Design Date: 01/24/2000 08:11:56 AM

Comments:

Results Summary

Fracture Simulation Options

| | |
|---------------------------|---------------------------------|
| Conventional 3D Model | Vertical Fracture |
| Run From Job-Design Data | Model Wellbore and Perforations |
| Proppant Convection | STIMPRO Temperature Model |
| Lithology Based Reservoir | STIMPRO Acidizing Model |

Results Summary

| | | | |
|----------------------------|--------|--|------|
| Model has run until (min) | 190.50 | Fracture efficiency | 0.01 |
| Fracture length (ft) | 206.84 | Propped length (ft) | 0.00 |
| Fracture upper height (ft) | 176.67 | Propped upper height (ft) | 0.00 |
| Fracture lower height (ft) | 197.95 | Propped lower height (ft) | 0.00 |
| Max width at well (in) | 0.04 | Average proppant concentration (lb/ft ²) | 0.00 |
| Dimensionless Cond. Ratio | 0.00 | | |

| | | | |
|----------------------------|-----------|------------------------------|-----------|
| Total fluid (bbls) | 4422.80 | Total sand (klbs) | 0.00 |
| Min Surface Pressure (psi) | 59815.24 | Max Surface Pressure (psi) | 112368.83 |
| Max Hydraulic Power (hp) | 137539.45 | Average Hydraulic Power (hp) | 39807.36 |

Dist. from Wellbore (ft) 0000.00 0025.85 0051.71 0077.56 0103.42 0129.27 0155.13 0180.98 0206.84
Width at Center (in) 0000.04 0000.04 0000.04 0000.04 0000.04 0000.03 0000.03 0000.02 0000.00

Run from Design Data Only

Treatment Schedule

| Stage # | Elapsed Time (min:sec) | Fluid Type | Clean Volume (kgal) | Proppant Conc. (ppg) | Slurry Rate (bpm) | Proppant Type | Cumul Time (min:sec) |
|----------------|---------------------------|-------------|------------------------|-------------------------|----------------------|---------------|-------------------------|
| Wellbore Fluid | | FRESH WATER | 1.2 | | | | |
| 1 | 23:48 | FRESH WATER | 1.0 | 0.00 | 1.00 | | 23:48 |
| 2 | 47:37 | FRESH WATER | 5.0 | 0.00 | 5.00 | | 47:37 |
| 3 | 71:25 | FRESH WATER | 10.0 | 0.00 | 10.00 | | 71:25 |
| 4 | 95:14 | FRESH WATER | 15.0 | 0.00 | 15.00 | | 95:14 |
| 5 | 119:02 | FRESH WATER | 25.0 | 0.00 | 25.00 | | 119:02 |
| 6 | 142:51 | FRESH WATER | 35.0 | 0.00 | 35.00 | | 142:51 |
| 7 | 166:40 | FRESH WATER | 45.0 | 0.00 | 45.00 | | 166:40 |
| 8 | 190:28 | FRESH WATER | 50.0 | 0.00 | 50.00 | | 190:28 |

| | |
|-----------------------------|--------|
| Scheduled clean vol (kgal) | 186.00 |
| Scheduled sand total (klbs) | 0.00 |
| Scheduled slurry vol (kgal) | 186.00 |

Name:

Helper Fed 2 SWD

01/28/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

| Stage # | Elapsed Time (min:sec) | Fluid Type | Stage Slry (kgal) | Cumul Gel (kgal) | Stage Prop (klbs) | Cumul Prop (klbs) | Clean Rate (bpm) |
|---------|---------------------------|-------------|----------------------|---------------------|----------------------|----------------------|---------------------|
| 1 | 23:48 | FRESH WATER | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 2 | 47:37 | FRESH WATER | 5.00 | 6.00 | 0.00 | 0.00 | 5.00 |
| 3 | 71:25 | FRESH WATER | 10.00 | 16.00 | 0.00 | 0.00 | 10.00 |
| 4 | 95:14 | FRESH WATER | 15.00 | 31.00 | 0.00 | 0.00 | 15.00 |
| 5 | 119:02 | FRESH WATER | 25.00 | 56.00 | 0.00 | 0.00 | 25.00 |
| 6 | 142:51 | FRESH WATER | 35.00 | 91.00 | 0.00 | 0.00 | 35.00 |
| 7 | 166:40 | FRESH WATER | 45.00 | 136.00 | 0.00 | 0.00 | 45.00 |
| 8 | 190:28 | FRESH WATER | 50.00 | 186.00 | 0.00 | 0.00 | 50.00 |

| Stage # | Elapsed Time (min:sec) | Fluid Type | Cumul Slry (kgal) | Stage N2 (scf) | Cumul N2 (scf) | Stage CO2 (klbs) | Cumul CO2 (klbs) |
|---------|---------------------------|-------------|----------------------|-------------------|-------------------|---------------------|---------------------|
| 1 | 23:48 | FRESH WATER | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 47:37 | FRESH WATER | 6.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 71:25 | FRESH WATER | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 95:14 | FRESH WATER | 31.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 119:02 | FRESH WATER | 56.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 142:51 | FRESH WATER | 91.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | 166:40 | FRESH WATER | 136.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8 | 190:28 | FRESH WATER | 186.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Leakoff Parameters

| | |
|--|-----------|
| Reservoir type | User Spec |
| Filtrate to reservoir fluid perm. ratio, Kp/KI | 10.00 |
| Reservoir pore pressure (psi) | 2,300.00 |
| Initial fracturing pressure (psi) | 5,400.00 |
| Reservoir fluid compressibility (1/psi) | 0.000385 |
| Cold filtrate viscosity (cp) | 1.00 |
| Hot filtrate viscosity (cp) | 1.00 |
| Cold reservoir viscosity (cp) | 0.03 |
| Hot reservoir viscosity (cp) | 0.03 |
| Porosity | 0.15 |
| Gas Leakoff Percentage | 100.00 |

Reservoir Parameters

| | |
|-------------------------------|----------|
| Reservoir temperature (°F) | 131.00 |
| Depth to center of Perfs (ft) | 5,902.00 |
| Perforated interval (ft) | 506.00 |
| Initial frac depth (ft) | 5,825.00 |

Name:

Helper Feder 2 SWD

01/28/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

Layer Parameters

| Layer # | Top of zone (ft) | Stress (psi) | Top of zone (ft) | Young's modulus (psi) | Poisson's ratio | Top of zone (ft) | Total Ct (ft/min ^{1/2}) | PoreFluid perm. (md) |
|---------|------------------|--------------|------------------|-----------------------|-----------------|------------------|-----------------------------------|----------------------|
| 1 | 0.0 | 3042 | 0.0 | 5.5e+006 | 0.22 | 0.0 | 6.926e-004 | 5.00e-003 |
| 2 | 4540.0 | 2376 | 4540.0 | 5.0e+006 | 0.20 | 4540.0 | 3.098e-003 | 1.00e-001 |
| 3 | 4600.0 | 3199 | 4600.0 | 5.5e+006 | 0.22 | 4600.0 | 6.926e-004 | 5.00e-003 |
| 4 | 4950.0 | 2587 | 4950.0 | 5.0e+006 | 0.20 | 4950.0 | 3.098e-003 | 1.00e-001 |
| 5 | 5000.0 | 3420 | 5000.0 | 5.5e+006 | 0.22 | 5000.0 | 6.926e-004 | 5.00e-003 |
| 6 | 5210.0 | 2625 | 5210.0 | 6.0e+006 | 0.25 | 5210.0 | 3.098e-004 | 1.00e-003 |
| 7 | 5290.0 | 4236 | 5290.0 | 3.0e+006 | 0.31 | 5290.0 | 9.796e-005 | 1.00e-004 |
| 8 | 5300.0 | 3561 | 5300.0 | 5.5e+006 | 0.22 | 5300.0 | 6.926e-004 | 5.00e-003 |
| 9 | 5330.0 | 2674 | 5330.0 | 6.0e+006 | 0.25 | 5330.0 | 3.098e-004 | 1.00e-003 |
| 10 | 5364.0 | 4302 | 5364.0 | 3.0e+006 | 0.31 | 5364.0 | 9.796e-005 | 1.00e-004 |
| 11 | 5390.0 | 2626 | 5390.0 | 1.0e+006 | 0.30 | 5390.0 | 3.098e-003 | 1.00e-001 |
| 12 | 5550.0 | 2796 | 5550.0 | 6.0e+006 | 0.25 | 5550.0 | 3.098e-004 | 1.00e-003 |
| 13 | 5634.0 | 2676 | 5634.0 | 4.7e+006 | 0.26 | 5634.0 | 2.190e-002 | 5.00e+000 |
| 14 | 6001.0 | 2775 | 6001.0 | 4.6e+006 | 0.27 | 6001.0 | 3.098e-004 | 1.00e-003 |
| 15 | 6066.0 | 2937 | 6066.0 | 5.4e+006 | 0.25 | 6066.0 | 2.190e-002 | 5.00e+000 |
| 16 | 6170.0 | 3085 | 6170.0 | 6.0e+006 | 0.25 | 6170.0 | 3.098e-004 | 1.00e-003 |

Lithology Parameters

| Layer # | Top of zone (ft) | Lithology | Top of zone (ft) | Fracture Toughness (psi-in ^{1/2}) | Top of zone (ft) | Dilatancy Factor |
|---------|------------------|-----------|------------------|---|------------------|------------------|
| 1 | 0.0 | Siltstone | 0.0 | 1000 | 0.0 | 1.00 |
| 2 | 4540.0 | Sandstone | 4540.0 | 1000 | 4540.0 | 1.00 |
| 3 | 4600.0 | Siltstone | 4600.0 | 1000 | 4600.0 | 1.00 |
| 4 | 4950.0 | Sandstone | 4950.0 | 1000 | 4950.0 | 1.00 |
| 5 | 5000.0 | Siltstone | 5000.0 | 1000 | 5000.0 | 1.00 |
| 6 | 5210.0 | Shale | 5210.0 | 1500 | 5210.0 | 1.00 |
| 7 | 5290.0 | Anhydrite | 5290.0 | 1500 | 5290.0 | 1.00 |
| 8 | 5300.0 | Siltstone | 5300.0 | 1000 | 5300.0 | 1.00 |
| 9 | 5330.0 | Shale | 5330.0 | 1500 | 5330.0 | 1.00 |
| 10 | 5364.0 | Anhydrite | 5364.0 | 1500 | 5364.0 | 1.00 |
| 11 | 5390.0 | Limestone | 5390.0 | 500 | 5390.0 | 1.00 |
| 12 | 5550.0 | Shale | 5550.0 | 1500 | 5550.0 | 1.00 |
| 13 | 5634.0 | Navajo | 5634.0 | 1000 | 5634.0 | 1.00 |
| 14 | 6001.0 | Wingate | 6001.0 | 1000 | 6001.0 | 1.00 |
| 15 | 6066.0 | Kayenta | 6066.0 | 1000 | 6066.0 | 1.00 |
| 16 | 6170.0 | Shale | 6170.0 | 1500 | 6170.0 | 1.00 |

Name:

Helper Fed 2 SWD

01/28/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

Well Trajectory

| <i>MD</i> <i>(ft)</i> | <i>TVD</i> <i>(ft)</i> | <i>Incl.</i> <i>(deg)</i> | <i>Azimuth</i> <i>(deg)</i> |
|--|---|--|--|
| 0 | 0 | 0.0 | 0.0 |
| 100 | 100 | 0.0 | 249.0 |
| 200 | 200 | 0.0 | 138.0 |
| 300 | 300 | 0.0 | 27.0 |
| 400 | 400 | 0.0 | 276.0 |
| 500 | 500 | 0.0 | 165.0 |
| 600 | 600 | 0.0 | 54.0 |
| 700 | 700 | 0.0 | 303.0 |
| 800 | 800 | 0.0 | 192.0 |
| 900 | 900 | 0.0 | 81.0 |
| 1,000 | 1,000 | 0.0 | 330.0 |
| 1,100 | 1,100 | 0.0 | 219.0 |
| 1,200 | 1,200 | 0.0 | 108.0 |
| 1,300 | 1,300 | 0.0 | 357.0 |
| 1,400 | 1,400 | 0.0 | 246.0 |
| 1,500 | 1,500 | 0.0 | 135.0 |
| 1,600 | 1,600 | 0.0 | 24.0 |
| 1,700 | 1,700 | 0.0 | 273.0 |
| 1,800 | 1,800 | 0.0 | 162.0 |
| 1,900 | 1,900 | 0.0 | 51.0 |
| 2,000 | 2,000 | 0.0 | 300.0 |
| 2,100 | 2,100 | 0.0 | 189.0 |
| 2,200 | 2,200 | 0.0 | 78.0 |
| 2,300 | 2,300 | 0.0 | 327.0 |
| 2,400 | 2,400 | 0.0 | 216.0 |
| 2,500 | 2,500 | 0.0 | 105.0 |
| 2,600 | 2,600 | 0.0 | 354.0 |
| 2,700 | 2,700 | 0.0 | 243.0 |
| 2,800 | 2,800 | 0.0 | 132.0 |
| 2,900 | 2,900 | 0.0 | 21.0 |
| 3,000 | 3,000 | 0.0 | 270.0 |
| 3,100 | 3,100 | 0.0 | 159.0 |
| 3,200 | 3,200 | 0.0 | 48.0 |
| 3,300 | 3,300 | 0.0 | 297.0 |
| 3,400 | 3,400 | 0.0 | 186.0 |
| 3,500 | 3,500 | 0.0 | 75.0 |
| 3,600 | 3,600 | 0.0 | 324.0 |
| 3,700 | 3,700 | 0.0 | 213.0 |
| 3,800 | 3,800 | 0.0 | 102.0 |
| 3,900 | 3,900 | 0.0 | 351.0 |
| 4,000 | 4,000 | 0.0 | 240.0 |
| 4,100 | 4,100 | 0.0 | 129.0 |
| 4,200 | 4,200 | 0.0 | 18.0 |
| 4,300 | 4,300 | 0.0 | 267.0 |
| 4,400 | 4,400 | 0.0 | 156.0 |
| 4,500 | 4,500 | 0.0 | 45.0 |
| 4,600 | 4,600 | 0.0 | 294.0 |
| 4,700 | 4,700 | 0.0 | 183.0 |

Name:

Helper Fed 2 SWD

01/28/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

| | | | |
|-------|-------|-----|-------|
| 4,800 | 4,800 | 0.0 | 72.0 |
| 4,900 | 4,900 | 0.0 | 321.0 |
| 5,000 | 5,000 | 0.0 | 210.0 |
| 5,100 | 5,100 | 0.0 | 99.0 |
| 5,200 | 5,200 | 0.0 | 348.0 |
| 5,300 | 5,300 | 0.0 | 237.0 |
| 5,400 | 5,400 | 0.0 | 126.0 |
| 5,500 | 5,500 | 0.0 | 15.0 |
| 5,600 | 5,600 | 0.0 | 264.0 |
| 5,649 | 5,649 | 0.0 | 0.0 |

Drilled Hole Description

| Type | Bit Diam (in) | Eff Diam (in) | Length (ft) | Top MD (ft) | Bottom MD (ft) |
|--------------|------------------|------------------|----------------|----------------|-------------------|
| Drilled Hole | 7.88 | 7.88 | 6,200.0 | 0.0 | 6,200.0 |

Casing In Place Description

| Type | OD (in) | ID (in) | Weight (lb/ft) | Grade | Length (ft) | Top MD (ft) | Bottom MD (ft) |
|-----------------|------------|------------|-------------------|-------|----------------|----------------|-------------------|
| Cemented Casing | 5.50 | 4.89 | 15.50 | K-55 | 6,200.0 | 0.0 | 6,200.0 |

Wellbore Configuration

Surface temperature (°F) 70

Temperature rise in w'bore (°F) 20

| Segment Length (ft) | Segment Type | Tubing ID (in) | Tubing OD (in) | Casing ID (in) |
|---------------------------|-----------------|----------------------|----------------------|----------------------|
| 5557.00 | Tubing | 2.200 | 2.875 | 4.892 |
| 92.00 | Casing | 0.000 | 0.000 | 4.892 |

Tubular Goods are defined to the TOP of the deepest set of perforations that are being modeled.

| Frac # | Top of Perfs TVD (ft) | Bot of Perfs TVD (ft) | Perf Diameter (in) | # of Perfs |
|-----------|-----------------------------|-----------------------------|--------------------------|------------|
| 1 | 5649 | 6155 | 0 | 1500 |

Near Wellbore Friction Parameters & Perf Multiplier

| Time min:sec | Flow Rate #1 (bpm) | Flow Rate #2 (bpm) | Delta P (psi) | Perf Coeff Multiplier |
|-----------------|-----------------------|-----------------------|------------------|--------------------------|
| 0:00 | 0.00 | 0.00 | 0.00 | 1.00 |

| | | |
|-----------------|------------------------------|------------|
| Name: | Helper Federf-2 SWD | 01/28/2000 |
| Well Location: | Sec 8-14S-10E Carbon County, | |
| Formation Name: | Navajo, Wingate | |
| Design Date: | 01/24/2000 08:11:56 AM | |

Model Parameters

Fracture Growth Parameters (Conventional 3D Model)

| | |
|---------------------------------|--|
| Crack Opening Coefficient | 0.7000000 |
| Rock Deformation Coefficient | 0.4000000 |
| Channel Flow Coefficient | 1.0000000 |
| Fluid Radial Weighting Exponent | set to default of Rock Deformation Coeff / 10. |

Proppant Model Parameters

| | |
|--|--------|
| Minimum Proppant Concentration (lb/ft ²) | 0.20 |
| Minimum Proppant Diameter (in) | 0.008 |
| Volume Fraction of Proppant in Slurry | 0.60 |
| Proppant Drag Effect Exponent | 8.00 |
| Proppant Radial Weighting Exponent | 0.2500 |
| Proppant Convection Coefficient | 10.00 |
| Proppant Settling Coefficient | 1.00 |
| Stop Model on Screenout | ON |
| Quadratic Backfill Model | ON |

| | |
|---------------------------------|------|
| Initial Leakoff Area Coeff | 1.00 |
| Closure Leakoff Area Coeff | 0.03 |
| Minimum Fracture Height | OFF |
| Near Wellbore Friction Exponent | 0.50 |

Federal F-2 SWD

1201' FSL & 840' FEL Sec 8-T14S-R10E

Carbon County, Utah

SPUD RIG OFF

SURFACE 07/06/1999 07/26/1999

PRODUCTION 11/05/1997

5659 GL KB

WELL WORK HISTORY

17 1/2" Hole
13 3/8" 48#
Set w/ 340 sxs cmt
Circ 32 bbls of cmt

12 1/4" Hole
8 5/8" 24# K-55
1000 sxs cmt
Circ 70 bbls of cmt

DV Tool

(Holes) Perforations

| | | |
|-------|--------|------|
| (244) | 5649 - | 5710 |
| (400) | 5720 - | 5820 |
| (448) | 5838 - | 5950 |
| (160) | 5958 - | 5998 |
| (176) | 6072 - | 6116 |
| (48) | 6143 - | 6155 |

(1,476) Total Holes

Hole Size 7 7/8"
5 1/2" 15.5# K-55
620 sxs cmt

TD 6200

317

2285

5020

6135

08/03/1999 Bond Log Run TOC at 2100'. Bottom of 8 5/8 at 2285.

SURFACE STRING

NOTES: Guide shoe and no floats used

13-3/8" 48# - set @ 317

CEMENT: Type: Class G @ 15.6 ppg

Volume: 340 sx

Cement Top: Circ 32 bbls cmt to surf

INTERMEDIATE STRING

FC@ 12620

NOTES: Bumped plug, floats did not hold

8-5/8" 24# J55 STC - set @ 2285

FS@ 2285

State DOGM witnessed

Hole Size: 12.25

TD: 12714

CEMENT:

Type: Hal-Lite @ 12.7 ppg & Class G @ 15.6 ppg

Volume: 750 lead / 250 tail

Cement Top: Circ 70 bbl cement

INJECTION STRING

FC@ 6155

NOTES: Full returns during cement job

5-1/2" 15.5# K55 LTC - set @ 6200

FS@ 6200

Added gilsonite for LC & CCM w/ LCM

Hole Size: 7.875"

TD: 6200

DV Tool @ 5020'

CEMENT:

Type: Hal-Lite @ 12.7 ppg & 50/50 Poz @ 14.4 ppg

Volume: 1st 200 sx / 2nd 420 sx

Calc. TOC: 1800' est.

DEVIATION ANGLE

| | |
|------|---------|
| 500 | 4 |
| 2121 | 4 13/20 |
| 2466 | 4 1/4 |
| 3254 | 5 |
| 4151 | 4 3/4 |
| 5021 | 5 1/2 |
| 5855 | 2 1/4 |

FORMATION

TOP

KB

5674

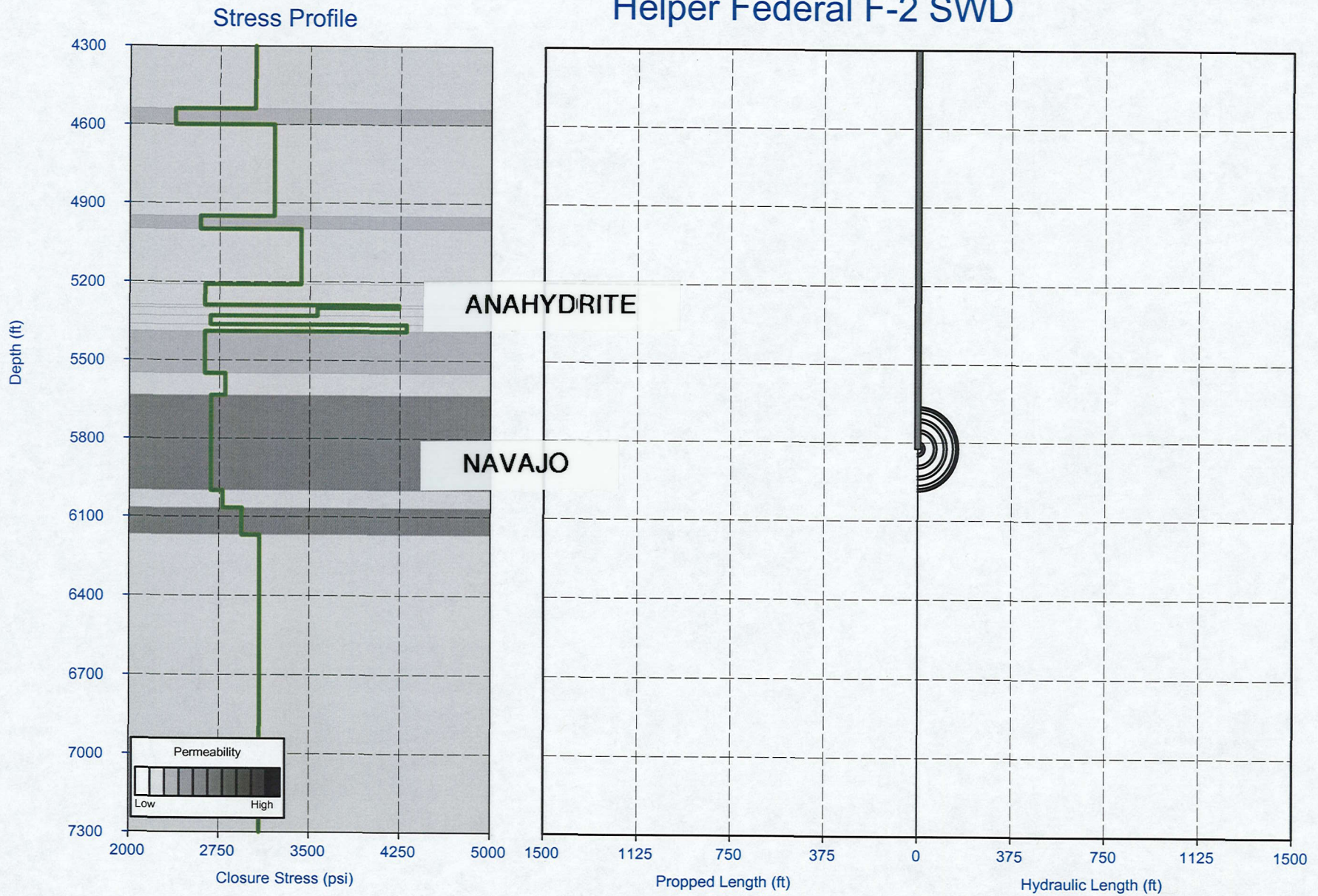
| | | |
|-------------------|------|------|
| Lower Carmel Lime | 5406 | 268 |
| Navajo | 5634 | 40 |
| Kayenta | 6001 | -327 |
| Wingate | 6066 | -392 |

Gross interval

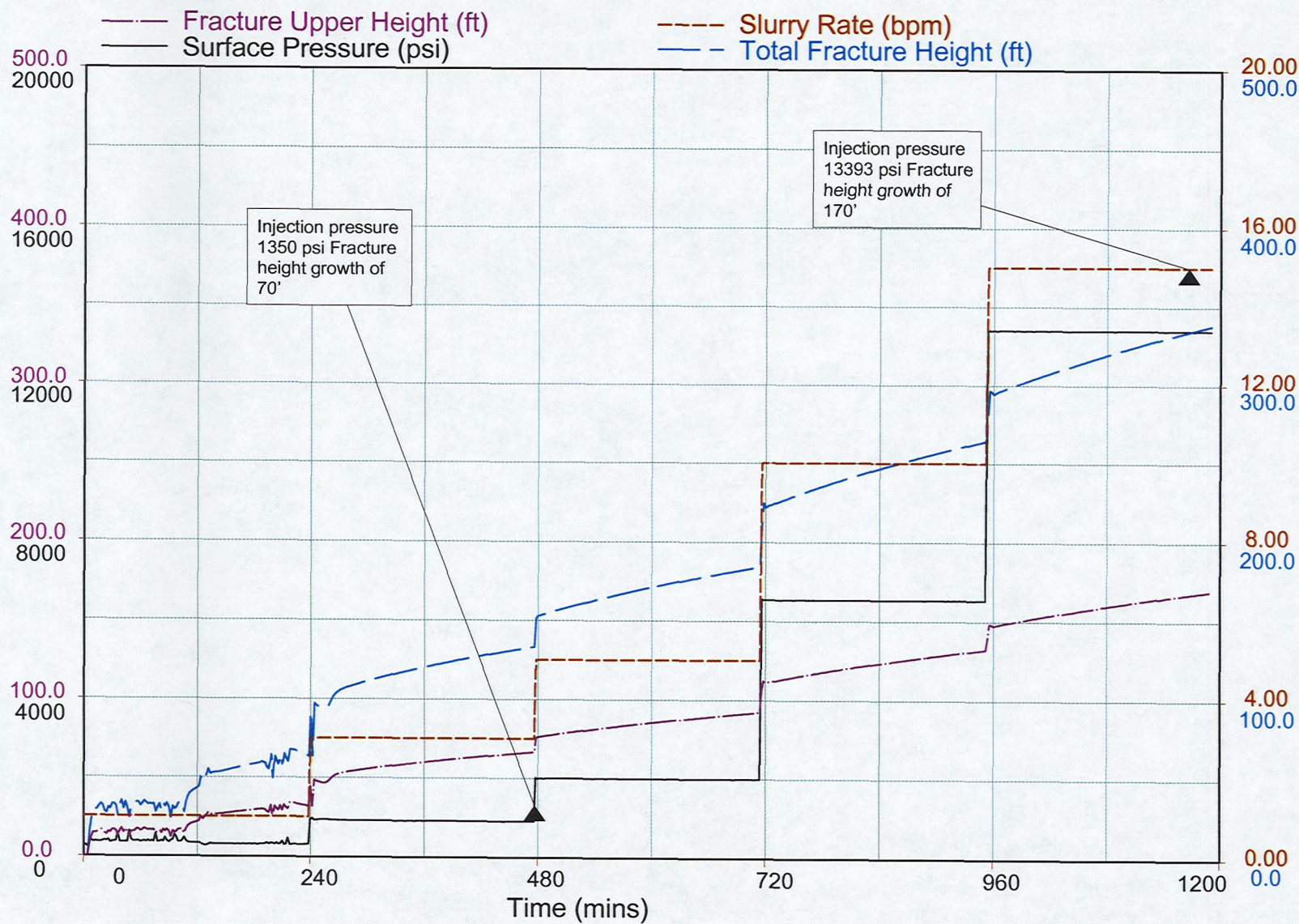
369'

LAST REVISED: 01/14/2000

Helper Federal F-2 SWD



Helper Federal F-2 SWD Sec 8-14S-10E Carbon County,



Navajo, Wingate

01/24/2000 08:11:56 AM

EXHIBIT B

EXHIBIT C

EXHIBIT D

EXHIBIT E

Fracturing Report

Well Name: Helper Federal F-2 SWD 02/08/2000
Well Location: Sec 8-14S-10E Carbon County,
Formation Name: Navajo, Wingate
Design Date: 01/24/2000 08:11:56 AM

Comments:

Results Summary

Fracture Simulation Options

Conventional 3D Model
Run From Job-Design Data
Proppant Convection
Lithology Based Reservoir

Vertical Fracture
Model Wellbore and Perforations
STIMPRO Temperature Model
STIMPRO Acidizing Model

Results Summary

| | | | |
|----------------------------|---------|--|------|
| Model has run until (min) | 1190.50 | Fracture efficiency | 0.00 |
| Fracture length (ft) | 133.74 | Propped length (ft) | 0.00 |
| Fracture upper height (ft) | 136.31 | Propped upper height (ft) | 0.00 |
| Fracture lower height (ft) | 126.54 | Propped lower height (ft) | 0.00 |
| Max width at well (in) | 0.03 | Average proppant concentration (lb/ft ²) | 0.00 |
| Dimensionless Cond. Ratio | 0.00 | | |

| | | | |
|----------------------------|---------|------------------------------|---------|
| Total fluid (bbls) | 8089.46 | Total sand (klbs) | 0.00 |
| Min Surface Pressure (psi) | 5155.19 | Max Surface Pressure (psi) | 9710.59 |
| Max Hydraulic Power (hp) | 3565.73 | Average Hydraulic Power (hp) | 1038.96 |

Dist. from Wellbore (ft) 0000.00 0016.72 0033.44 0050.15 0066.87 0083.59 0100.31 0117.03 0133.74
Width at Center (in) 0000.03 0000.03 0000.03 0000.03 0000.02 0000.02 0000.02 0000.01 0000.00

Run from Design Data Only

Treatment Schedule

| Stage # | Elapsed Time (min:sec) | Fluid Type | Clean Volume (kgal) | Proppant Conc. (ppg) | Slurry Rate (bpm) | Proppant Type | Cumul Time (min:sec) |
|---------|---------------------------|----------------------------|------------------------|-------------------------|----------------------|---------------|-------------------------|
| | | Wellbore Fluid FRESH WATER | 1.2 | | | | |
| 1 | 238:05 | FRESH WATER | 10.0 | 0.00 | 1.00 | | 238:05 |
| 2 | 476:11 | FRESH WATER | 30.0 | 0.00 | 3.00 | | 476:11 |
| 3 | 714:17 | FRESH WATER | 50.0 | 0.00 | 5.00 | | 714:17 |
| 4 | 952:22 | FRESH WATER | 100.0 | 0.00 | 10.00 | | 952:22 |
| 5 | 1190:28 | FRESH WATER | 150.0 | 0.00 | 15.00 | | 1190:28 |

| | |
|-----------------------------|--------|
| Scheduled clean vol (kgal) | 340.00 |
| Scheduled sand total (klbs) | 0.00 |
| Scheduled slurry vol (kgal) | 340.00 |

Well Name: Helper Feder-2 SWD 02/08/2000
 Well Location: Sec 8-14S-10E Carbon County,
 Formation Name: Navajo, Wingate
 Design Date: 01/24/2000 08:11:56 AM

| Stage # | Elapsed Time (min:sec) | Fluid Type | Stage Slry (kgal) | Cumul Gel (kgal) | Stage Prop (klbs) | Cumul Prop (klbs) | Clean Rate (bpm) |
|---------|------------------------|-------------|-------------------|------------------|-------------------|-------------------|------------------|
| 1 | 238:05 | FRESH WATER | 10.00 | 10.00 | 0.00 | 0.00 | 1.00 |
| 2 | 476:11 | FRESH WATER | 30.00 | 40.00 | 0.00 | 0.00 | 3.00 |
| 3 | 714:17 | FRESH WATER | 50.00 | 90.00 | 0.00 | 0.00 | 5.00 |
| 4 | 952:22 | FRESH WATER | 100.00 | 190.00 | 0.00 | 0.00 | 10.00 |
| 5 | 1190:28 | FRESH WATER | 150.00 | 340.00 | 0.00 | 0.00 | 15.00 |

| Stage # | Elapsed Time (min:sec) | Fluid Type | Cumul Slry (kgal) | Stage N2 (scf) | Cumul N2 (scf) | Stage CO2 (klbs) | Cumul CO2 (klbs) |
|---------|------------------------|-------------|-------------------|----------------|----------------|------------------|------------------|
| 1 | 238:05 | FRESH WATER | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 476:11 | FRESH WATER | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 714:17 | FRESH WATER | 90.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 952:22 | FRESH WATER | 190.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1190:28 | FRESH WATER | 340.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Leakoff Parameters

| | |
|--|-----------|
| Reservoir type | User Spec |
| Filtrate to reservoir fluid perm. ratio, Kp/KI | 10.00 |
| Reservoir pore pressure (psi) | 2,300.00 |
| Initial fracturing pressure (psi) | 5,400.00 |
| Reservoir fluid compressibility (1/psi) | 0.000385 |
| Cold filtrate viscosity (cp) | 1.00 |
| Hot filtrate viscosity (cp) | 1.00 |
| Cold reservoir viscosity (cp) | 0.03 |
| Hot reservoir viscosity (cp) | 0.03 |
| Porosity | 0.15 |
| Gas Leakoff Percentage | 100.00 |

Reservoir Parameters

| | |
|-------------------------------|----------|
| Reservoir temperature (°F) | 131.00 |
| Depth to center of Perfs (ft) | 6,120.00 |
| Perforated interval (ft) | 400.00 |
| Initial frac depth (ft) | 6,047.50 |

Well Name:

Helper Fed 2 SWD

02/08/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

Layer Parameters

| Lay # | Top of zone (ft) | Stress (psi) | Top of zone (ft) | Young's modulus (psi) | Poisson's ratio | Top of zone (ft) | Total Ct (ft/min ^{1/2}) | PoreFluid perm. (md) |
|-------|------------------|--------------|------------------|-----------------------|-----------------|------------------|-----------------------------------|----------------------|
| 1 | 0.0 | 3042 | 0.0 | 5.5e+006 | 0.22 | 0.0 | 6.927e-004 | 5.00e-003 |
| 2 | 4540.0 | 2376 | 4540.0 | 5.0e+006 | 0.20 | 4540.0 | 3.098e-003 | 1.00e-001 |
| 3 | 4600.0 | 3199 | 4600.0 | 5.5e+006 | 0.22 | 4600.0 | 6.927e-004 | 5.00e-003 |
| 4 | 4950.0 | 2587 | 4950.0 | 5.0e+006 | 0.20 | 4950.0 | 3.098e-003 | 1.00e-001 |
| 5 | 5000.0 | 3420 | 5000.0 | 5.5e+006 | 0.22 | 5000.0 | 6.927e-004 | 5.00e-003 |
| 6 | 5210.0 | 2671 | 5210.0 | 6.0e+006 | 0.25 | 5210.0 | 3.098e-004 | 1.00e-003 |
| 7 | 5472.0 | 4381 | 5472.0 | 3.0e+006 | 0.31 | 5472.0 | 9.796e-005 | 1.00e-004 |
| 8 | 5480.0 | 3679 | 5480.0 | 5.5e+006 | 0.22 | 5480.0 | 6.927e-004 | 5.00e-003 |
| 9 | 5502.0 | 2755 | 5502.0 | 6.0e+006 | 0.25 | 5502.0 | 3.098e-004 | 1.00e-003 |
| 10 | 5518.0 | 4428 | 5518.0 | 3.0e+006 | 0.31 | 5518.0 | 0.000e+000 | 0.00e+000 |
| 11 | 5552.0 | 2788 | 5552.0 | 6.0e+006 | 0.25 | 5552.0 | 0.000e+000 | 0.00e+000 |
| 12 | 5598.0 | 4491 | 5598.0 | 3.0e+006 | 0.31 | 5598.0 | 9.796e-005 | 1.00e-004 |
| 13 | 5630.0 | 2731 | 5630.0 | 1.0e+006 | 0.30 | 5630.0 | 3.098e-003 | 1.00e-001 |
| 14 | 5750.0 | 2905 | 5750.0 | 6.0e+006 | 0.25 | 5750.0 | 3.098e-004 | 1.00e-003 |
| 15 | 5870.0 | 3373 | 5870.0 | 4.7e+006 | 0.26 | 5870.0 | 2.190e-002 | 5.00e+000 |
| 16 | 6175.0 | 3605 | 6175.0 | 5.4e+006 | 0.25 | 6175.0 | 3.098e-004 | 1.00e-003 |
| 17 | 6255.0 | 3521 | 6255.0 | 4.6e+006 | 0.27 | 6255.0 | 2.190e-002 | 5.00e+000 |
| 18 | 6320.0 | 3160 | 6320.0 | 6.0e+006 | 0.25 | 6320.0 | 3.098e-004 | 1.00e-003 |

Lithology Parameters

| Layer # | Top of zone (ft) | Lithology | Formation Name |
|---------|------------------|-----------|----------------|
| 1 | 0.0 | Siltstone | |
| 2 | 4540.0 | Sandstone | |
| 3 | 4600.0 | Siltstone | |
| 4 | 4950.0 | Sandstone | |
| 5 | 5000.0 | Siltstone | |
| 6 | 5210.0 | Shale | |
| 7 | 5472.0 | Anhydrite | |
| 8 | 5480.0 | Siltstone | |
| 9 | 5502.0 | Shale | |
| 10 | 5518.0 | Anhydrite | |
| 11 | 5552.0 | Shale | |
| 12 | 5598.0 | Anhydrite | |
| 13 | 5630.0 | Limestone | |
| 14 | 5750.0 | Shale | |
| 15 | 5870.0 | Navajo | |
| 16 | 6175.0 | Kayenta | |
| 17 | 6255.0 | Wingate | |
| 18 | 6320.0 | Shale | |

Well Name:

Helper Feder 2 SWD

02/08/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

| <i>Layer #</i> | <i>Top of zone (ft)</i> | <i>Fracture Toughness (psi-in^{1/2})</i> | <i>Layer #</i> | <i>Top of zone (ft)</i> | <i>Dilatancy Factor</i> |
|--------------------|---------------------------------|--|--------------------|---------------------------------|-----------------------------|
| 1 | 0.0 | 1000 | 1 | 0.0 | 1.00 |
| 2 | 4540.0 | 1000 | 2 | 4540.0 | 1.00 |
| 3 | 4600.0 | 1000 | 3 | 4600.0 | 1.00 |
| 4 | 4950.0 | 1000 | 4 | 4950.0 | 1.00 |
| 5 | 5000.0 | 1000 | 5 | 5000.0 | 1.00 |
| 6 | 5210.0 | 1500 | 6 | 5210.0 | 1.00 |
| 7 | 5472.0 | 1500 | 7 | 5472.0 | 1.00 |
| 8 | 5480.0 | 1000 | 8 | 5480.0 | 1.00 |
| 9 | 5502.0 | 1500 | 9 | 5502.0 | 1.00 |
| 10 | 5518.0 | 1500 | 10 | 5518.0 | 1.00 |
| 11 | 5552.0 | 1500 | 11 | 5552.0 | 1.00 |
| 12 | 5598.0 | 1500 | 12 | 5598.0 | 1.00 |
| 13 | 5630.0 | 500 | 13 | 5630.0 | 1.00 |
| 14 | 5750.0 | 1500 | 14 | 5750.0 | 1.00 |
| 15 | 5870.0 | 1000 | 15 | 5870.0 | 1.00 |
| 16 | 6175.0 | 1000 | 16 | 6175.0 | 1.00 |
| 17 | 6255.0 | 1000 | 17 | 6255.0 | 1.00 |
| 18 | 6320.0 | 1500 | 18 | 6320.0 | 1.00 |

Name:

Helper Feder 2 SWD

02/08/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

Well Trajectory

| <i>MD</i> <i>(ft)</i> | <i>TVD</i> <i>(ft)</i> | <i>Incl.</i> <i>(deg)</i> | <i>Azimuth</i> <i>(deg)</i> |
|--|---|--|--|
| 0 | 0 | 0.0 | 0.0 |
| 100 | 100 | 0.0 | 249.0 |
| 200 | 200 | 0.0 | 138.0 |
| 300 | 300 | 0.0 | 27.0 |
| 400 | 400 | 0.0 | 276.0 |
| 500 | 500 | 0.0 | 165.0 |
| 600 | 600 | 0.0 | 54.0 |
| 700 | 700 | 0.0 | 303.0 |
| 800 | 800 | 0.0 | 192.0 |
| 900 | 900 | 0.0 | 81.0 |
| 1,000 | 1,000 | 0.0 | 330.0 |
| 1,100 | 1,100 | 0.0 | 219.0 |
| 1,200 | 1,200 | 0.0 | 108.0 |
| 1,300 | 1,300 | 0.0 | 357.0 |
| 1,400 | 1,400 | 0.0 | 246.0 |
| 1,500 | 1,500 | 0.0 | 135.0 |
| 1,600 | 1,600 | 0.0 | 24.0 |
| 1,700 | 1,700 | 0.0 | 273.0 |
| 1,800 | 1,800 | 0.0 | 162.0 |
| 1,900 | 1,900 | 0.0 | 51.0 |
| 2,000 | 2,000 | 0.0 | 300.0 |
| 2,100 | 2,100 | 0.0 | 189.0 |
| 2,200 | 2,200 | 0.0 | 78.0 |
| 2,300 | 2,300 | 0.0 | 327.0 |
| 2,400 | 2,400 | 0.0 | 216.0 |
| 2,500 | 2,500 | 0.0 | 105.0 |
| 2,600 | 2,600 | 0.0 | 354.0 |
| 2,700 | 2,700 | 0.0 | 243.0 |
| 2,800 | 2,800 | 0.0 | 132.0 |
| 2,900 | 2,900 | 0.0 | 21.0 |
| 3,000 | 3,000 | 0.0 | 270.0 |
| 3,100 | 3,100 | 0.0 | 159.0 |
| 3,200 | 3,200 | 0.0 | 48.0 |
| 3,300 | 3,300 | 0.0 | 297.0 |
| 3,400 | 3,400 | 0.0 | 186.0 |
| 3,500 | 3,500 | 0.0 | 75.0 |
| 3,600 | 3,600 | 0.0 | 324.0 |
| 3,700 | 3,700 | 0.0 | 213.0 |
| 3,800 | 3,800 | 0.0 | 102.0 |
| 3,900 | 3,900 | 0.0 | 351.0 |
| 4,000 | 4,000 | 0.0 | 240.0 |
| 4,100 | 4,100 | 0.0 | 129.0 |
| 4,200 | 4,200 | 0.0 | 18.0 |
| 4,300 | 4,300 | 0.0 | 267.0 |
| 4,400 | 4,400 | 0.0 | 156.0 |
| 4,500 | 4,500 | 0.0 | 45.0 |
| 4,600 | 4,600 | 0.0 | 294.0 |
| 4,700 | 4,700 | 0.0 | 183.0 |

Well Name:

Helper Feder 2 SWD

02/08/2000

Well Location:

Sec 8-14S-10E Carbon County,

Formation Name:

Navajo, Wingate

Design Date:

01/24/2000 08:11:56 AM

| | | | |
|-------|-------|-----|-------|
| 4,800 | 4,800 | 0.0 | 72.0 |
| 4,900 | 4,900 | 0.0 | 321.0 |
| 5,000 | 5,000 | 0.0 | 210.0 |
| 5,100 | 5,100 | 0.0 | 99.0 |
| 5,200 | 5,200 | 0.0 | 348.0 |
| 5,300 | 5,300 | 0.0 | 237.0 |
| 5,400 | 5,400 | 0.0 | 126.0 |
| 5,500 | 5,500 | 0.0 | 15.0 |
| 5,600 | 5,600 | 0.0 | 264.0 |
| 5,649 | 5,649 | 0.0 | 0.0 |

Drilled Hole Description

| Type | Bit Diam (in) | Eff Diam (in) | Length (ft) | Top MD (ft) | Bottom MD (ft) |
|--------------|------------------|------------------|----------------|----------------|-------------------|
| Drilled Hole | 7.88 | 7.88 | 6,200.0 | 0.0 | 6,200.0 |

Casing In Place Description

| Type | OD (in) | ID (in) | Weight (lb/ft) | Grade | Length (ft) | Top MD (ft) | Bottom MD (ft) |
|-----------------|------------|------------|-------------------|-------|----------------|----------------|-------------------|
| Cemented Casing | 5.50 | 4.89 | 15.50 | K-55 | 6,489.0 | 0.0 | 6,489.0 |

Drill Pipe Description

| Type | OD (in) | ID (in) | Weight (lb/ft) | Grade | Length (ft) | Top MD (ft) | Bottom MD (ft) |
|--------|------------|------------|-------------------|-------|----------------|----------------|-------------------|
| Tubing | 2.88 | 2.20 | 6.50 | J-55 | 5,900.0 | 0.0 | 5,900.0 |

Wellbore Configuration

Surface temperature (°F) 70

Temperature rise in w bore (°F) 20

| Segment Length (ft) | Segment Type | Tubing ID (in) | Tubing OD (in) | Casing ID (in) |
|---------------------------|-----------------|----------------------|----------------------|----------------------|
| 5900.00 | Tubing | 2.200 | 2.875 | 4.892 |
| 20.00 | Casing | 0.000 | 0.000 | 4.892 |

Tubular Goods are defined to the TOP of the deepest set of perforations that are being modeled.

| Frac # | Top of Perfs TVD (ft) | Bot of Perfs TVD (ft) | Perf Diameter (in) | # of Perfs |
|-----------|-----------------------------|-----------------------------|--------------------------|------------|
| 1 | 5920 | 6320 | 0 | 276 |

| | | |
|-----------------|------------------------------|------------|
| Well Name: | Helper Fed 2 SWD | 02/08/2000 |
| Well Location: | Sec 8-14S-10E Carbon County, | |
| Formation Name: | Navajo, Wingate | |
| Design Date: | 01/24/2000 08:11:56 AM | |

Near Wellbore Friction Parameters & Perf Multiplier

| <i>Time</i> | <i>Flow Rate #1</i> | <i>Flow Rate #2</i> | <i>Delta P</i> | <i>Perf Coeff</i> |
|----------------|---------------------|---------------------|----------------|-------------------|
| <i>min:sec</i> | <i>(bpm)</i> | <i>(bpm)</i> | <i>(psi)</i> | <i>Multiplier</i> |
| 0:00 | 0.00 | 0.00 | 0.00 | 1.00 |

Model Parameters

Fracture Growth Parameters (Conventional 3D Model)

| | |
|------------------------------|-----------|
| Crack Opening Coefficient | 0.7000000 |
| Rock Deformation Coefficient | 0.4000000 |
| Channel Flow Coefficient | 1.0000000 |

Fluid Radial Weighting Exponent set to default of Rock Deformation Coeff / 10.

Proppant Model Parameters

| | |
|--|--------|
| Minimum Proppant Concentration (lb/ft ²) | 0.20 |
| Minimum Proppant Diameter (in) | 0.008 |
| Volume Fraction of Proppant in Slurry | 0.60 |
| Proppant Drag Effect Exponent | 8.00 |
| Proppant Radial Weighting Exponent | 0.2500 |
| Proppant Convection Coefficient | 10.00 |
| Proppant Settling Coefficient | 1.00 |
| Stop Model on Screenout | ON |
| Quadratic Backfill Model | ON |

| | |
|---------------------------------|------|
| Initial Leakoff Area Coeff | 1.00 |
| Closure Leakoff Area Coeff | 0.03 |
| Minimum Fracture Height | OFF |
| Near Wellbore Friction Exponent | 0.50 |

Helper State SWD #1

1131' FSL & 2194' FWL Sec 3-T14S-R10E

Carbon County, Utah

SPUD RIG OFF

SURFACE 09/26/1997 10/27/1997

PRODUCTION 11/05/1997

5965' GL KB

17 1/2" Hole
13 3/8" 48#
Set w/ 360 sxs cmt

319

12 1/4" Hole
8 5/8" 24# K-55
360 sxs cmt

2811

DV Tool

4983

Packer

5896

(Holes Perforations

(280) 5920 - 6090

(168) 6112 - 6154

(256) 6256 - 6320

(704) Total Holes

Hole Size 7 7/8"
5 1/2" 17# N-80
870 sxs cmt

6450

TD 6489

WELL WORK HISTORY

NOTES:

TUBING BREAKDOWN

12' KB CORR
5878.53' 186 JTS 2 7/8"
J-55 6.5#/FT
Doulin-10
1.50' Baker on=off tool
4.2' Baker lok-set
Packer
EOT 5896

ROD BREAKDOWN

DEVIATION ANGL

1264 1 3/4
2258 2 3/10
3946 2 3/4
4380 2 1/2

FORMATION

Morrison

Gross Coal

Gross interval

TOP

3380

KB

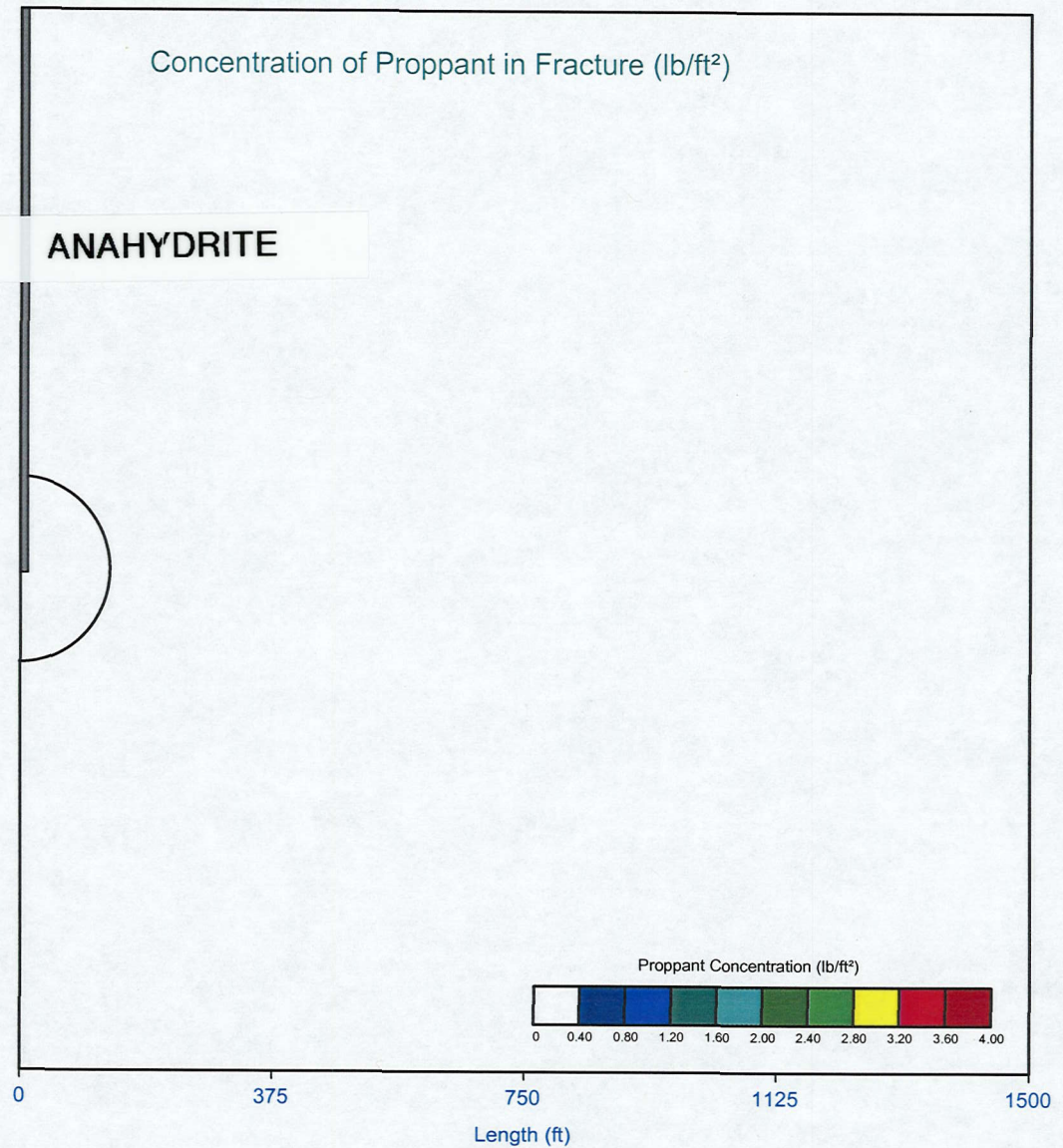
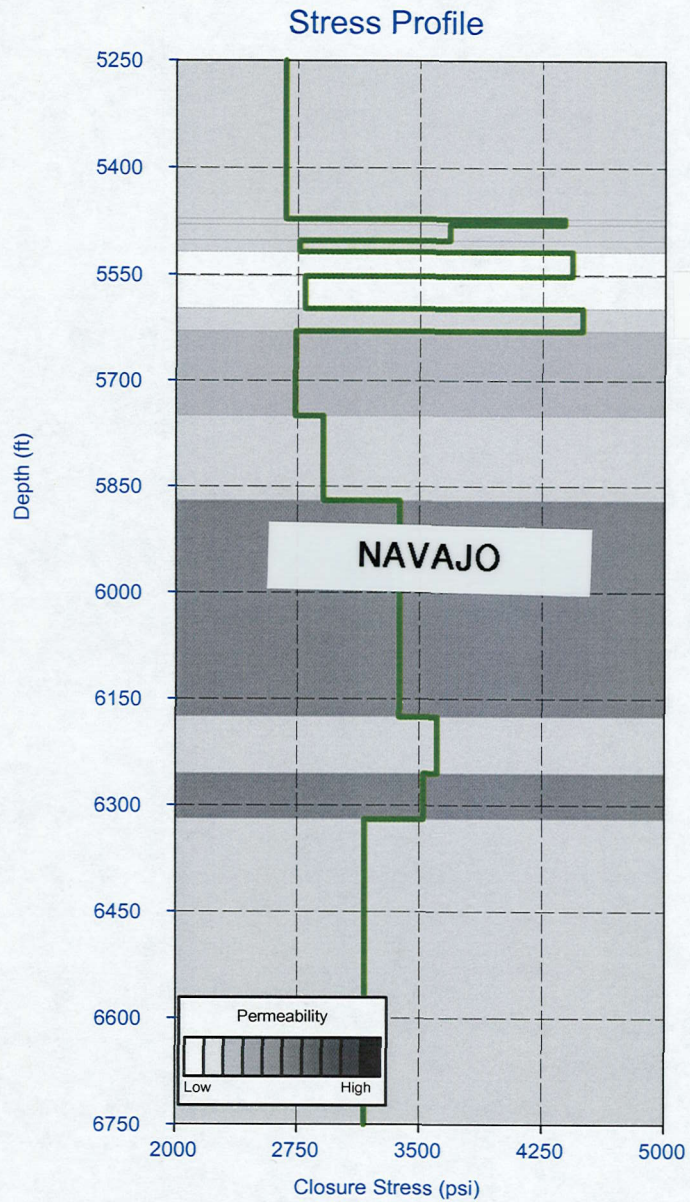
-3380

0

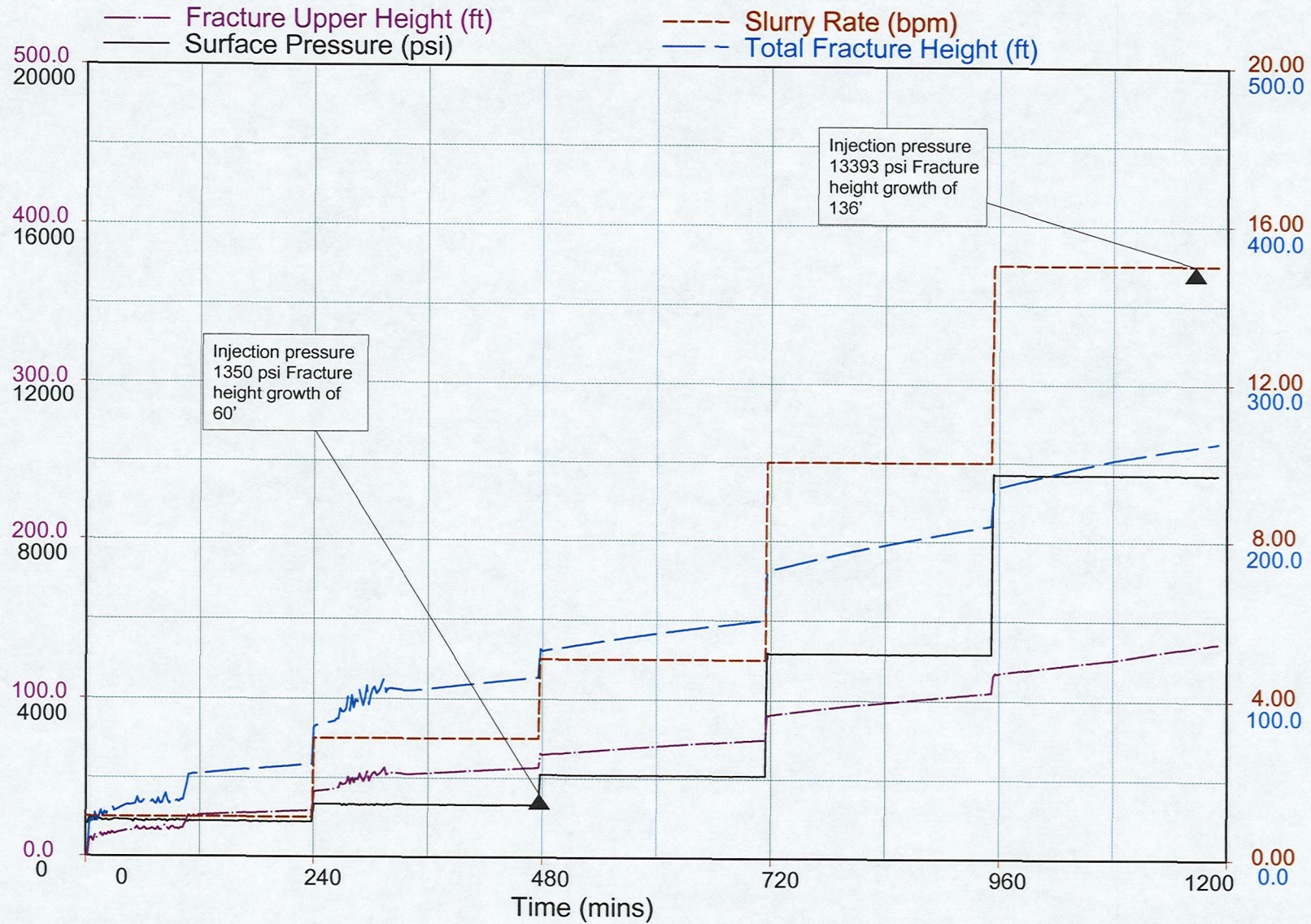
0

LAST REVISED: 01/27/2000

Helper Federal F-2 SWD



Helper Federal F-2 SWD Sec 8-14S-10E Carbon County,



Navajo, Wingate

01/24/2000 08:11:56 AM

TABLE 1

TABLE 1

| API | Well Name | Location | QTR | Sec. | T | R | Co. | Zone | Carmel Anhydrite 1 | | | Carmel Anhydrite 2 | | | Carmel Anhydrite 3 | | | Carmel Anhydrite Gross | | |
|------------|---------------------|---------------------|-------|------|-----|-----|--------|--------|--------------------|--------|-------------|--------------------|--------|-------------|--------------------|--------|-------------|------------------------|------------|------------------------|
| | | | | | | | | | Top 1 | Base 1 | Net 1 (ft.) | Top 2 | Base 2 | Net 2 (ft.) | Top 3 | Base 3 | Net 3 (ft.) | Top Gross | Base Gross | Net Total Anhyd. (ft.) |
| 4300730040 | Drunkards Wash 31-1 | 1000 FSL 1552 FWL | SESW | 31 | 14S | 10E | Carbon | Navaho | 5240 | 5252 | 12 | 5306 | 5353 | 38 | 5402 | 5440 | 38 | 5240 | 5440 | 88 |
| 4300730093 | Arcadia-Telonis 1 | 465 FSL 560 FWL | SESE | 18 | 14S | 9E | Carbon | Navaho | 6742 | 6755 | 13 | 6818 | 6825 | 7 | 6892 | 6932 | 36 | 6742 | 6932 | 56 |
| 4300730100 | USA D-6 | 1300 FSL 800 FWL | SWSW | 34 | 14S | 9E | Carbon | Navaho | 6665 | 6676 | 11 | 6720 | 6760 | 32 | 6812 | 6848 | 28 | 6665 | 6848 | 71 |
| 4300730290 | Utah D-3 | 1600 FSL 1126 FWL | NWSW | 18 | 15S | 10E | Carbon | Navaho | 5133 | 5142 | 9 | 5184 | 5220 | 28 | 5270 | 5304 | 30 | 5133 | 5304 | 67 |
| 4300730314 | Utah D-4 | 600 FNL 500 FWL | NWNW | 24 | 14S | 9E | Carbon | Navaho | 5590 | 5600 | 10 | 5644 | 5694 | 48 | 5744 | 5784 | 40 | 5590 | 5784 | 98 |
| 4300730351 | Fausett D-5 | 467 FNL 1461 FWL | NENW | 16 | 14S | 9E | Carbon | Navaho | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | |
| 4300730431 | Utah D-8 | 1342 FNL 350 FWL | SWNW | 12 | 15S | 9E | Carbon | Navaho | 5594 | 5604 | 10 | 5648 | 5678 | 20 | 5732 | 5770 | 38 | 5594 | 5770 | 68 |
| 4300730438 | Utah D-9 | 1960 FNL 1487 FWL | SESW | 32 | 14S | 9E | Carbon | Navaho | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | |
| 4300730520 | RGC D-10 | 162 FNL 1557 FEL | NWNE | 28 | 15S | 9E | Carbon | Navaho | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | |
| 4301530338 | Utah D-7 | 1371 FSL 1530 FEL | NWSE | 2 | 16S | 9E | Emery | Navaho | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | |
| 4301530356 | USA D-11 | 1513 FNL 2437 FEL | SWNE | 13 | 16S | 9E | Emery | Navaho | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | |
| 4300730557 | Sampinos D-14 ? | (Possible New Well) | NWSE | 16 | 15S | 10E | Carbon | Navaho | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | | Log Not Avail. | | |
| 4300730555 | Federal SWD F-2 | 1201 FSL 840 FEL | SE SE | 8 | 14S | 10E | Carbon | | 5210 | 5262 | 46 | 5292 | 5326 | 34 | 5364 | 5396 | 30 | 5210 | 5396 | 110 |

↑
VALUES USED FOR
ANHYDRITE STRUCTURE

↑
VALUES USED FOR
ANHYDRITE NET
ISOPACH

RECEIVED
FEB 1 2001
DIVISION OF
OIL, GAS AND MINES

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

FORM 9

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL OR DEEPEN form for such purposes

| | | |
|---|--|---|
| 1. TYPE OF WELL OIL WELL <input type="checkbox"/> GAS WELL <input type="checkbox"/> OTHER: <u>Salt Water Disposal</u> | | 5. LEASE DESIGNATION AND SERIAL NUMBER: <u>UTU-65762</u> |
| 2. NAME OF OPERATOR: <u>Anadarko Petroleum Corporation</u> | | 6. IF INDIAN, ALLOTTEE OR TRIBE NAME: <u>N/A</u> |
| 3. ADDRESS OF OPERATOR: <u>17001 Northchase Dr., Houston, Texas 77060</u> | | 7. UNIT or CA AGREEMENT NAME: <u>N/A</u> |
| 4. LOCATION OF WELL FOOTAGES AT SURFACE: <u>1201' FSL & 840' FEL</u> QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: <u>SE/4 OF SEC. 8, T14S, R10E</u> | | 8. WELL NAME and NUMBER: <u>Federal F-2 SWD</u> 9. API NUMBER: <u>43-007-30555</u> |
| | | 10. FIELD AND POOL, OR WILDCAT: <u>HELPER CBM</u> |
| | | COUNTY: <u>CARBON</u> STATE: <u>UTAH</u> |

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

| TYPE OF SUBMISSION | TYPE OF ACTION | | |
|---|---|---|--|
| <input checked="" type="checkbox"/> NOTICE OF INTENT (Submit in Duplicate) Approximate date work will start: _____ | <input type="checkbox"/> ACIDIZE | <input type="checkbox"/> DEEPEN | <input type="checkbox"/> REFERFORATE CURRENT FORMATION |
| | <input type="checkbox"/> ALTER CASING | <input type="checkbox"/> FRACTURE TREAT | <input type="checkbox"/> SIDETRACK TO REPAIR WELL |
| | <input type="checkbox"/> CASING REPAIR | <input type="checkbox"/> NEW CONSTRUCTION | <input type="checkbox"/> TEMPORARILY ABANDON |
| | <input type="checkbox"/> CHANGE TO PREVIOUS PLANS | <input type="checkbox"/> OPERATOR CHANGE | <input type="checkbox"/> TUBING REPAIR |
| | <input checked="" type="checkbox"/> CHANGE TUBING | <input type="checkbox"/> PLUG AND ABANDON | <input type="checkbox"/> VENT OR FLARE |
| | <input type="checkbox"/> CHANGE WELL NAME | <input type="checkbox"/> PLUG BACK | <input type="checkbox"/> WATER DISPOSAL |
| | <input type="checkbox"/> CHANGE WELL STATUS | <input type="checkbox"/> PRODUCTION (START/RESUME) | <input type="checkbox"/> WATER SHUT-OFF |
| | <input type="checkbox"/> COMMINGLE PRODUCING FORMATIONS | <input type="checkbox"/> RECLAMATION OF WELL SITE | <input type="checkbox"/> OTHER _____ |
| | <input type="checkbox"/> CONVERT WELL TYPE | <input type="checkbox"/> RECOMPLETE - DIFFERENT FORMATION | |

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. (Clearly show all pertinent details including dates, depths, volumes, etc.)

Please be advised of change in tubing from 2-7/8" to 3-1/2".
Thank you

**Accepted by the
Utah Division of
Oil, Gas and Mining
FOR RECORD ONLY**

RECEIVED
AUG 8 2001
DIVISION OF
OIL, GAS AND MINING

NAME (PLEASE PRINT) Jennifer Berlin

TITLE Environmental Regulatory Analyst

SIGNATURE [Signature]

DATE 8/8/01

(This space for State use only)



STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

FORM 9

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL OR DEEPEN form for such purposes

1. TYPE OF WELL OIL WELL ☐ GAS WELL ☐ OTHER: Salt Water Disposal

2. NAME OF OPERATOR:

Anadarko Petroleum Corporation

3. ADDRESS OF OPERATOR:

17001 Northchase Dr., Houston, Texas 77060.

PHONE NUMBER:

281-874-3441

5. LEASE DESIGNATION AND SERIAL NUMBER:
UTU-65762

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:
N/A

7. UNIT or CA AGREEMENT NAME:
N/A

8. WELL NAME and NUMBER:
Federal F-2 SWD

9. API NUMBER:
43-007-30555

10. FIELD AND POOL, OR WILDCAT:
HELPER CBM

4. LOCATION OF WELL

FOOTAGES AT SURFACE:

1201' FSL & 840' FEL

QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN:

SE/4 OF SEC. 8, T14S, R10E

COUNTY:

CARBON

STATE:

UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

| TYPE OF SUBMISSION | TYPE OF ACTION | | |
|--|---|---|--|
| <input checked="" type="checkbox"/> NOTICE OF INTENT (Submit in Duplicate) Approximate date work will start: | <input type="checkbox"/> ACIDIZE | <input type="checkbox"/> DEEPEN | <input type="checkbox"/> REFERFORATE CURRENT FORMATION |
| | <input type="checkbox"/> ALTER CASING | <input type="checkbox"/> FRACTURE TREAT | <input type="checkbox"/> SIDETRACK TO REPAIR WELL |
| | <input type="checkbox"/> CASING REPAIR | <input type="checkbox"/> NEW CONSTRUCTION | <input type="checkbox"/> TEMPORARILY ABANDON |
| | <input type="checkbox"/> CHANGE TO PREVIOUS PLANS | <input type="checkbox"/> OPERATOR CHANGE | <input type="checkbox"/> TUBING REPAIR |
| | <input checked="" type="checkbox"/> CHANGE TUBING | <input type="checkbox"/> PLUG AND ABANDON | <input type="checkbox"/> VENT OR FLARE |
| <input type="checkbox"/> SUBSEQUENT REPORT (Submit Original Form Only) Date of work completion: | <input type="checkbox"/> CHANGE WELL NAME | <input type="checkbox"/> PLUG BACK | <input type="checkbox"/> WATER DISPOSAL |
| | <input type="checkbox"/> CHANGE WELL STATUS | <input type="checkbox"/> PRODUCTION (START/RESUME) | <input type="checkbox"/> WATER SHUT-OFF |
| | <input type="checkbox"/> COMMINGLE PRODUCING FORMATIONS | <input type="checkbox"/> RECLAMATION OF WELL SITE | <input type="checkbox"/> OTHER |
| | <input type="checkbox"/> CONVERT WELL TYPE | <input type="checkbox"/> RECOMPLETE - DIFFERENT FORMATION | |

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. (Clearly show all pertinent details including dates, depths, volumes, etc.)

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Thank you

Accepted by the
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FOR RECORD ONLY

RECEIVED

AUG 09 2001

DIVISION OF
OIL, GAS AND MINING

NAME (PLEASE PRINT) Jennifer Berlin

TITLE Environmental Regulatory Analyst

SIGNATURE

DATE 8/8/01

(This space for State use only)

STATE OF UTAH
DIVISION OF OIL GAS AND MINING

INJECTION WELL - PRESSURE TEST

| | |
|--------------------------------------|--|
| Well Name: <u>Helper Fed SWD F-2</u> | API Number: <u>43-007-30555</u> |
| Qtr/Qtr: _____ | Section: <u>8</u> |
| Company Name: <u>Anadarko</u> | Township: <u>14-S</u> Range: <u>10-E</u> |
| Lease: State _____ Fee _____ | Federal <input checked="" type="checkbox"/> Indian _____ |
| Inspector: <u>Mark T Jones</u> | Date: <u>10/4/2001</u> |

Initial Conditions:

Tubing - Rate: varies Pressure: 1250 psiCasing/Tubing Annulus - Pressure: 0 psi

Conditions During Test:

| Time (Minutes) | Annulus Pressure | Tubing Pressure |
|----------------|------------------|----------------------|
| 0 | <u>1000</u> | <u>1000</u> 10:55 am |
| 5 | _____ | _____ |
| 10 | _____ | _____ |
| 15 | _____ | _____ |
| 20 | <u>1000</u> | <u>0</u> 11:15 am |
| 25 | _____ | _____ |
| 30 | <u>1000</u> | <u>0</u> 11:25 am |

Results: Pass/Fail

Conditions After Test:

Tubing Pressure: 500 psiCasing/Tubing Annulus Pressure: 500 psi

COMMENTS: _____

Richard Dietz
Operator Representative

STATE OF UTAH
DIVISION OF OIL GAS AND MINING

INJECTION WELL - PRESSURE TEST

| | |
|---|--|
| Well Name: <u>Fed F-2</u> | API Number: <u>4300730555</u> |
| Qtr/Qtr: <u>SESE</u> Section: <u>8</u> | Township: <u>14S</u> Range: <u>10E</u> |
| Company Name: <u>Anadarko Petroleum</u> | |
| Lease: State _____ Fee _____ | Federal <u>X</u> Indian _____ |
| Inspector: <u>Mark Jones</u> | Date: <u>9/7/2004</u> |

Initial Conditions:

Tubing - Rate: 5913 BPD Pressure: 900 psi
 Casing/Tubing Annulus - Pressure: 0 psi

Conditions During Test:

| Time (Minutes) | Annulus Pressure | Tubing Pressure |
|----------------|------------------|-----------------|
| 0 <u>8:26</u> | <u>1000 #</u> | <u>900 #</u> |
| 5 | _____ | _____ |
| 10 | _____ | _____ |
| 15 <u>8:41</u> | <u>1000 #</u> | <u>900 #</u> |
| 20 | _____ | _____ |
| 25 | _____ | _____ |
| 30 | _____ | _____ |

Results: Pass/Fail

Conditions After Test:

Tubing Pressure: 900 # psi
 Casing/Tubing Annulus Pressure: 200 psi

COMMENTS: Injecting while testing.

Kenny Wilcox
 Operator Representative

STATE OF UTAH
DIVISION OF OIL GAS AND MINING

INJECTION WELL - PRESSURE TEST

| | |
|---|--|
| Well Name: <u>Helper Fed F-2 SWD</u> | API Number: <u>4300730555</u> |
| Qtr/Qtr: <u>SESE</u> Section: <u>8</u> | Township: <u>14S</u> Range: <u>10E</u> |
| Company Name: <u>Anadarko Petroleum</u> | |
| Lease: State _____ Fee _____ | Federal <u>X</u> Indian _____ |
| Inspector: <u>Mark Jones</u> | Date: <u>8-18-09</u> |

Initial Conditions:

Tubing - Rate: 6000 BBL/DAY Pressure: 500 psi
 Casing/Tubing Annulus - Pressure: ~~100~~ psi

Conditions During Test:

| Time (Minutes) | Annulus Pressure | Tubing Pressure |
|-----------------|--------------------------|-----------------|
| 0 <u>9:45</u> | <u>1000 #</u> | <u>500 #</u> |
| 5 | | |
| 10 | | |
| 15 <u>10:00</u> | <u>1000 #</u> | <u>500 #</u> |
| 20 | | |
| 25 | | |
| 30 <u>11:15</u> | <u>1000 #</u> | <u>500 #</u> |

Results: Pass/Fail

Conditions After Test:

Tubing Pressure: 500 psiCasing/Tubing Annulus Pressure: 0 psi

COMMENTS: Annulus gauge read 100 # until open valve to pump. Bled
to 0 # @ this time. Well injecting @ TOI.

Dave Wilcox and Jim Hartley
 Operator Representative

INJECTION WELL - PRESSURE TEST

| | |
|---|--|
| Well Name: <u>Helper Fed F-2 SWD</u> | API Number: <u>4300730555</u> |
| Qtr/Qtr: _____ | Section: <u>8</u> |
| Company Name: <u>Anadarko Petroleum</u> | Township: <u>14S</u> Range: <u>10E</u> |
| Lease: State _____ Fee _____ | Federal <u>X</u> Indian _____ |
| Inspector: <u>Mark Jones</u> | Date: <u>8-18-09</u> |

Initial Conditions:

Tubing - Rate: 6000 BBL/DAY Pressure: 500 psi
 Casing/Tubing Annulus - Pressure: ~~100~~ psi

Conditions During Test:

| Time (Minutes) | Annulus Pressure | Tubing Pressure |
|-----------------|--------------------------|-----------------|
| 0 <u>9:45</u> | <u>1000 #</u> | <u>500 #</u> |
| 5 | _____ | _____ |
| 10 | _____ | _____ |
| 15 <u>10:00</u> | <u>1000 #</u> | <u>500 #</u> |
| 20 | _____ | _____ |
| 25 | _____ | _____ |
| 30 <u>11:15</u> | <u>1000 #</u> | <u>500 #</u> |

Results: Pass/Fail

Conditions After Test:

Tubing Pressure: 500 psiCasing/Tubing Annulus Pressure: 0 psi

RECEIVED

DEC 15 2009

DIV. OF OIL, GAS & MINING

COMMENTS: Annulus gauge read 100 # until open valve to pump. Bled to 0 # @ this time. Well injecting @ TOI.

Dave Wilcox and Jim Hartley
 Operator Representative

Division of Oil, Gas and Mining
OPERATOR CHANGE WORKSHEET (for state use only)

ROUTING
CDW

X - Change of Operator (Well Sold)

Operator Name Change/Merger

The operator of the well(s) listed below has changed, effective:

4/1/2013

FROM: (Old Operator):

N0035-Anadarko Petroleum Corporation
 PO Box 173779
 Denver, CO, 80214

Phone: 1 (720) 929-6000

TO: (New Operator):

N3940- Anadarko E&P Onshore LLC
 PO Box 173779
 Denver, CO 802014

Phone: 1 (720) 929-6000

| CA No. | | | | Unit: | | | | |
|-------------------|-------------|--|--|--------|-----------|------------|-----------|-------------|
| WELL NAME | SEC TWN RNG | | | API NO | ENTITY NO | LEASE TYPE | WELL TYPE | WELL STATUS |
| See Attached List | | | | | | | | |

OPERATOR CHANGES DOCUMENTATION

Enter date after each listed item is completed

- (R649-8-10) Sundry or legal documentation was received from the **FORMER** operator on: 4/9/2013
- (R649-8-10) Sundry or legal documentation was received from the **NEW** operator on: 4/9/2013
- The new company was checked on the **Department of Commerce, Division of Corporations Database** on: 4/10/2013
- a. Is the new operator registered in the State of Utah: Business Number: 593715-0161
- a. (R649-9-2) Waste Management Plan has been received on: Yes
- b. Inspections of LA PA state/fee well sites complete on: 4/10/2013
- c. Reports current for Production/Disposition & Sundries on: 4/10/2013
- Federal and Indian Lease Wells:** The BLM and or the BIA has approved the merger, name change, or operator change for all wells listed on Federal or Indian leases on: BLM 4/2/2013 BIA N/A
- Federal and Indian Units:**
The BLM or BIA has approved the successor of unit operator for wells listed on: N/A
- Federal and Indian Communization Agreements ("CA"):**
The BLM or BIA has approved the operator for all wells listed within a CA on: N/A
- Underground Injection Control ("UIC")** Division has approved UIC Form 5 Transfer of Authority to **Inject**, for the enhanced/secondary recovery unit/project for the water disposal well(s) listed on: 4/10/2013

DATA ENTRY:

- Changes entered in the **Oil and Gas Database** on: 4/11/2013
- Changes have been entered on the **Monthly Operator Change Spread Sheet** on: 4/11/2013
- Bond information entered in RBDMS on: 4/10/2013
- Fee/State wells attached to bond in RBDMS on: 4/11/2013
- Injection Projects to new operator in RBDMS on: 4/11/2013
- Receipt of Acceptance of Drilling Procedures for APD/New on: N/A

BOND VERIFICATION:

- Federal well(s) covered by Bond Number: WYB000291
- Indian well(s) covered by Bond Number: N/A
- a. (R649-3-1) The **NEW** operator of any state/fee well(s) listed covered by Bond Number 22013542
- b. The **FORMER** operator has requested a release of liability from their bond on: N/A

LEASE INTEREST OWNER NOTIFICATION:

- (R649-2-10) The **NEW** operator of the fee wells has been contacted and informed by a letter from the Division of their responsibility to notify all interest owners of this change on: 4/11/2013

COMMENTS:

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

FORM 9

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL form for such proposals.

| | | |
|---|--|--|
| 1. TYPE OF WELL OIL WELL <input type="checkbox"/> GAS WELL <input type="checkbox"/> OTHER <u>CBM Wells</u> | | 5. LEASE DESIGNATION AND SERIAL NUMBER: See Wells |
| 2. NAME OF OPERATOR: Anadarko Petroleum Corporation | | 6. IF INDIAN, ALLOTTEE OR TRIBE NAME: |
| 3. ADDRESS OF OPERATOR: P.O. Box 173779 CITY Denver STATE CO ZIP 80217 | | 7. UNIT or CA AGREEMENT NAME: |
| PHONE NUMBER: (720) 929-6000 | | 8. WELL NAME and NUMBER: |
| 4. LOCATION OF WELL FOOTAGES AT SURFACE: | | 9. API NUMBER: See Wells |
| QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: | | 10. FIELD AND POOL, OR WILDCAT: |
| COUNTY: | | STATE: UTAH |

| 11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA | | | |
|--|---|---|--|
| TYPE OF SUBMISSION | TYPE OF ACTION | | |
| <input type="checkbox"/> NOTICE OF INTENT (Submit in Duplicate) Approximate date work will start: <u>4/8/2013</u> | <input type="checkbox"/> ACIDIZE | <input type="checkbox"/> DEEPEN | <input type="checkbox"/> REPERFORATE CURRENT FORMATION |
| | <input type="checkbox"/> ALTER CASING | <input type="checkbox"/> FRACTURE TREAT | <input type="checkbox"/> SIDETRACK TO REPAIR WELL |
| | <input type="checkbox"/> CASING REPAIR | <input type="checkbox"/> NEW CONSTRUCTION | <input type="checkbox"/> TEMPORARILY ABANDON |
| | <input type="checkbox"/> CHANGE TO PREVIOUS PLANS | <input checked="" type="checkbox"/> OPERATOR CHANGE | <input type="checkbox"/> TUBING REPAIR |
| | <input type="checkbox"/> CHANGE TUBING | <input type="checkbox"/> PLUG AND ABANDON | <input type="checkbox"/> VENT OR FLARE |
| <input type="checkbox"/> SUBSEQUENT REPORT (Submit Original Form Only) Date of work completion: | <input type="checkbox"/> CHANGE WELL NAME | <input type="checkbox"/> PLUG BACK | <input type="checkbox"/> WATER DISPOSAL |
| | <input type="checkbox"/> CHANGE WELL STATUS | <input type="checkbox"/> PRODUCTION (START/RESUME) | <input type="checkbox"/> WATER SHUT-OFF |
| | <input type="checkbox"/> COMMINGLE PRODUCING FORMATIONS | <input type="checkbox"/> RECLAMATION OF WELL SITE | <input type="checkbox"/> OTHER: |
| | <input type="checkbox"/> CONVERT WELL TYPE | <input type="checkbox"/> RECOMPLETE - DIFFERENT FORMATION | |

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

The operator is requesting authorization to transfer the wells from Anadarko Petroleum Corporation and Anadarko Production Company to Anadarko E&P Onshore, LLC. Please see the attached list of 181 wells that are currently filed under Anadarko Petroleum Corporation and Anadarko Production Company. The state/fee wells will be under bond number 22013542, and the federal wells will be under bond number WYB000291.

Effective 4/1/13
Please contact the undersigned if there are any questions.

Jaime Scharnowske

Jaime Scharnowske
Regulatory Analyst

Anadarko Petroleum Corporation N0035
P.O. Box 173779
Denver, CO 80214
(720) 929-6000

Jaime Scharnowske DIV OF OIL, GAS & MINING

Jaime Scharnowske
Regulatory Analyst

Anadarko E&P Onshore, LLC N3940
P.O. Box 173779
Denver, CO 80214
(720) 929-6000

| | |
|--|---------------------------------|
| NAME (PLEASE PRINT) <u>Jaime Scharnowske</u> | TITLE <u>Regulatory Analyst</u> |
| SIGNATURE <i>Jaime Scharnowske</i> | DATE <u>4/8/2013</u> |

(This space for State use only)

APPROVED

APR 11 2013

Rachel Medina

Anadarko Petroleum Corporation (N0035) to Anadarko E&P Onshore, LLC (N3940)
Effective 1st April-2013

| Well Name | Sec | Twnsbp | Range | API | Entity No. | Lease Type | Well Type | Well status |
|-------------------------|-----|--------|-------|------------|------------|------------|-----------|-------------|
| HELPER ST SWD 1 | 03 | 140S | 100E | 4300730361 | 12258 | State | WD | A |
| FED F-2 SWD | 08 | 140S | 100E | 4300730555 | 12557 | Federal | WD | A |
| CLAWSON SPRING ST SWD 4 | 13 | 160S | 080E | 4301530477 | 12979 | State | WD | A |
| CLAWSON SPRING ST SWD 1 | 36 | 150S | 080E | 4300730721 | 12832 | State | WD | I |
| HELPER FED B-1 | 33 | 130S | 100E | 4300730189 | 11537 | Federal | GW | P |
| HELPER FED A-1 | 23 | 130S | 100E | 4300730190 | 11517 | Federal | GW | P |
| HELPER FED A-3 | 22 | 130S | 100E | 4300730213 | 11700 | Federal | GW | P |
| HELPER FED C-1 | 22 | 130S | 100E | 4300730214 | 11702 | Federal | GW | P |
| HELPER FED B-5 | 27 | 130S | 100E | 4300730215 | 11701 | Federal | GW | P |
| HELPER FED A-2 | 22 | 130S | 100E | 4300730216 | 11699 | Federal | GW | P |
| HELPER FED D-1 | 26 | 130S | 100E | 4300730286 | 12061 | Federal | GW | P |
| BIRCH A-1 | 05 | 140S | 100E | 4300730348 | 12120 | Fee | GW | P |
| HELPER ST A-1 | 03 | 140S | 100E | 4300730349 | 12122 | State | GW | P |
| HELPER ST D-7 | 04 | 140S | 100E | 4300730350 | 12121 | State | GW | P |
| CHUBBUCK A-1 | 31 | 130S | 100E | 4300730352 | 12397 | Fee | GW | P |
| VEA A-1 | 32 | 130S | 100E | 4300730353 | 12381 | Fee | GW | P |
| VEA A-2 | 32 | 130S | 100E | 4300730354 | 12483 | Fee | GW | P |
| VEA A-3 | 32 | 130S | 100E | 4300730355 | 12398 | Fee | GW | P |
| VEA A-4 | 32 | 130S | 100E | 4300730356 | 12482 | Fee | GW | P |
| HELPER ST A-8 | 02 | 140S | 100E | 4300730357 | 12257 | State | GW | P |
| HELPER ST A-3 | 02 | 140S | 100E | 4300730358 | 12254 | State | GW | P |
| HELPER ST A-4 | 02 | 140S | 100E | 4300730359 | 12255 | State | GW | P |
| HELPER ST A-7 | 02 | 140S | 100E | 4300730360 | 12256 | State | GW | P |
| HELPER ST A-2 | 03 | 140S | 100E | 4300730362 | 12232 | State | GW | P |
| HELPER ST A-5 | 03 | 140S | 100E | 4300730363 | 12231 | State | GW | P |
| HELPER ST A-6 | 03 | 140S | 100E | 4300730364 | 12233 | State | GW | P |
| HELPER ST D-4 | 04 | 140S | 100E | 4300730365 | 12228 | State | GW | P |
| HELPER ST D-3 | 05 | 140S | 100E | 4300730366 | 12184 | State | GW | P |
| HELPER ST D-5 | 04 | 140S | 100E | 4300730367 | 12226 | State | GW | P |
| HELPER ST D-8 | 04 | 140S | 100E | 4300730368 | 12229 | State | GW | P |
| HELPER ST D-2 | 05 | 140S | 100E | 4300730369 | 12481 | State | GW | P |
| HELPER ST D-6 | 05 | 140S | 100E | 4300730370 | 12234 | State | GW | P |
| HELPER ST D-1 | 06 | 140S | 100E | 4300730371 | 12399 | State | GW | P |
| BIRCH A-2 | 08 | 140S | 100E | 4300730372 | 12189 | Fee | GW | P |
| HELPER ST A-9 | 10 | 140S | 100E | 4300730373 | 12230 | State | GW | P |
| HELPER ST B-1 | 09 | 140S | 100E | 4300730376 | 12227 | State | GW | P |
| HELPER FED F-3 | 08 | 140S | 100E | 4300730378 | 12252 | Federal | GW | P |
| HELPER FED F-4 | 09 | 140S | 100E | 4300730379 | 12253 | Federal | GW | P |
| HELPER ST A-10 | 10 | 140S | 100E | 4300730433 | 12488 | State | GW | P |
| HELPER ST A-11 | 11 | 140S | 100E | 4300730434 | 12487 | State | GW | P |
| HELPER ST A-12 | 10 | 140S | 100E | 4300730435 | 12486 | State | GW | P |
| HELPER ST A-13 | 10 | 140S | 100E | 4300730436 | 12485 | State | GW | P |
| HELPER ST B-2 | 09 | 140S | 100E | 4300730437 | 12484 | State | GW | P |
| HELPER FED E-7 | 19 | 130S | 100E | 4300730508 | 13623 | Federal | GW | P |
| HELPER FED B-2 | 33 | 130S | 100E | 4300730530 | 12619 | Federal | GW | P |
| HELPER FED B-3 | 33 | 130S | 100E | 4300730531 | 12622 | Federal | GW | P |
| HELPER FED B-4 | 33 | 130S | 100E | 4300730532 | 12623 | Federal | GW | P |
| HELPER FED B-6 | 27 | 130S | 100E | 4300730533 | 12644 | Federal | GW | P |
| HELPER FED B-7 | 27 | 130S | 100E | 4300730534 | 12645 | Federal | GW | P |
| HELPER FED B-8 | 27 | 130S | 100E | 4300730535 | 12631 | Federal | GW | P |

Anadarko Petroleum Corporation (N0035) to Anadarko E&P Onshore, LLC (N3940)
Effective 1-April-2013

| Well Name | Sec | Twnshp | Range | API | Entity No. | Lease Type | Well Type | Well status |
|-----------------------|-----|--------|-------|------------|------------|------------|-----------|-------------|
| HELPER FED B-9 | 34 | 130S | 100E | 4300730536 | 12646 | Federal | GW | P |
| HELPER FED B-10 | 34 | 130S | 100E | 4300730537 | 12626 | Federal | GW | P |
| HELPER FED B-11 | 34 | 130S | 100E | 4300730538 | 12628 | Federal | GW | P |
| HELPER FED B-12 | 34 | 130S | 100E | 4300730539 | 12627 | Federal | GW | P |
| HELPER FED B-13 | 28 | 130S | 100E | 4300730540 | 12621 | Federal | GW | P |
| HELPER FED B-14 | 28 | 130S | 100E | 4300730541 | 12620 | Federal | GW | P |
| HELPER FED D-2 | 26 | 130S | 100E | 4300730542 | 12650 | Federal | GW | P |
| HELPER FED D-3 | 26 | 130S | 100E | 4300730543 | 12634 | Federal | GW | P |
| HELPER FED D-4 | 35 | 130S | 100E | 4300730544 | 12625 | Federal | GW | P |
| HELPER FED D-5 | 35 | 130S | 100E | 4300730545 | 12637 | Federal | GW | P |
| HELPER FED D-6 | 35 | 130S | 100E | 4300730546 | 12635 | Federal | GW | P |
| HELPER FED E-1 | 29 | 130S | 100E | 4300730547 | 13246 | Federal | GW | P |
| HELPER FED E-2 | 29 | 130S | 100E | 4300730548 | 12636 | Federal | GW | P |
| HELPER FED H-1 | 01 | 140S | 100E | 4300730549 | 12653 | Federal | GW | P |
| HELPER FED H-2 | 01 | 140S | 100E | 4300730550 | 12647 | Federal | GW | P |
| OLIVETO FED A-2 | 08 | 140S | 100E | 4300730556 | 12630 | Federal | GW | P |
| HELPER FED F-1 | 08 | 140S | 100E | 4300730557 | 12629 | Federal | GW | P |
| SMITH FED A-1 | 09 | 140S | 100E | 4300730558 | 13004 | Federal | GW | P |
| SE INVESTMENTS A-1 | 06 | 140S | 100E | 4300730570 | 12624 | Fee | GW | P |
| HELPER ST A-14 | 11 | 140S | 100E | 4300730571 | 12612 | State | GW | P |
| HELPER ST A-15 | 11 | 140S | 100E | 4300730572 | 12613 | State | GW | P |
| HELPER ST E-1 | 36 | 130S | 100E | 4300730573 | 12615 | State | GW | P |
| HELPER ST E-2 | 36 | 130S | 100E | 4300730574 | 12614 | State | GW | P |
| HARMOND A-1 | 07 | 140S | 100E | 4300730586 | 12616 | Fee | GW | P |
| HELPER ST E-3 | 36 | 130S | 100E | 4300730592 | 12868 | State | GW | P |
| HELPER FED A-6 | 23 | 130S | 100E | 4300730593 | 12649 | Federal | GW | P |
| HELPER FED D-7 | 26 | 130S | 100E | 4300730594 | 12651 | Federal | GW | P |
| HELPER FED D-8 | 35 | 130S | 100E | 4300730595 | 12652 | Federal | GW | P |
| CLAWSON SPRING ST A-1 | 36 | 150S | 080E | 4300730597 | 12618 | State | GW | P |
| HELPER ST E-4 | 36 | 130S | 100E | 4300730598 | 12825 | State | GW | P |
| HELPER ST A-16 | 11 | 140S | 100E | 4300730603 | 12638 | State | GW | P |
| CHUBBUCK A-2 | 06 | 140S | 100E | 4300730604 | 12648 | Fee | GW | P |
| CLAWSON SPRING ST A-2 | 36 | 150S | 080E | 4300730635 | 12856 | State | GW | P |
| CLAWSON SPRING ST A-3 | 36 | 150S | 080E | 4300730636 | 13001 | State | GW | P |
| CLAWSON SPRING ST A-4 | 36 | 150S | 080E | 4300730637 | 12844 | State | GW | P |
| CLAWSON SPRING ST D-5 | 31 | 150S | 090E | 4300730642 | 12852 | State | GW | P |
| CLAWSON SPRING ST D-6 | 31 | 150S | 090E | 4300730643 | 12847 | State | GW | P |
| CLAWSON SPRING ST D-7 | 31 | 150S | 090E | 4300730644 | 12849 | State | GW | P |
| HELPER FED A-5 | 23 | 130S | 100E | 4300730677 | 13010 | Federal | GW | P |
| HELPER FED A-7 | 22 | 130S | 100E | 4300730678 | 13346 | Federal | GW | P |
| HELPER FED B-15 | 28 | 130S | 100E | 4300730679 | 13015 | Federal | GW | P |
| HELPER FED B-16 | 28 | 130S | 100E | 4300730680 | 13203 | Federal | GW | P |
| HELPER FED C-2 | 24 | 130S | 100E | 4300730681 | 13016 | Federal | GW | P |
| HELPER FED C-4 | 24 | 130S | 100E | 4300730682 | 13012 | Federal | GW | P |
| HELPER FED C-7 | 21 | 130S | 100E | 4300730684 | 13204 | Federal | GW | P |
| HELPER FED D-9 | 25 | 130S | 100E | 4300730685 | 13245 | Federal | GW | P |
| HELPER FED D-10 | 25 | 130S | 100E | 4300730686 | 12993 | Federal | GW | P |
| HELPER FED D-11 | 25 | 130S | 100E | 4300730687 | 12992 | Federal | GW | P |
| HELPER FED D-12 | 25 | 130S | 100E | 4300730688 | 13005 | Federal | GW | P |
| HELPER FED E-4 | 29 | 130S | 100E | 4300730689 | 13229 | Federal | GW | P |

Anadarko Petroleum Corporation (N0035) to Anadarko E&P Onshore, LLC (N3940)
Effective 1-April-2013

| Well Name | Sec | Twnshp | Range | API | Entity No. | Lease Type | Well Type | Well status |
|-----------------------|-----|--------|-------|------------|------------|------------|-----------|-------------|
| HELPER FED A-4 | 23 | 130S | 100E | 4300730692 | 13009 | Federal | GW | P |
| HELPER FED C-5 | 24 | 130S | 100E | 4300730693 | 13013 | Federal | GW | P |
| HELPER FED G-1 | 30 | 130S | 110E | 4300730694 | 13006 | Federal | GW | P |
| HELPER FED G-2 | 30 | 130S | 110E | 4300730695 | 13007 | Federal | GW | P |
| HELPER FED G-3 | 31 | 130S | 110E | 4300730696 | 13002 | Federal | GW | P |
| HELPER FED G-4 | 31 | 130S | 110E | 4300730697 | 13003 | Federal | GW | P |
| HELPER FED H-3 | 01 | 140S | 100E | 4300730698 | 12831 | Federal | GW | P |
| HELPER FED H-4 | 01 | 140S | 100E | 4300730699 | 12833 | Federal | GW | P |
| CLAWSON SPRING ST D-8 | 31 | 150S | 090E | 4300730701 | 12851 | State | GW | P |
| HELPER FED C-3 | 24 | 130S | 100E | 4300730702 | 13011 | Federal | GW | P |
| CLAWSON SPRING ST J-1 | 35 | 150S | 080E | 4300730726 | 13299 | Fee | GW | P |
| PIERUCCI 1 | 35 | 150S | 080E | 4300730727 | 13325 | Fee | GW | P |
| POTTER ETAL 1 | 35 | 150S | 080E | 4300730728 | 12958 | Fee | GW | P |
| POTTER ETAL 2 | 35 | 150S | 080E | 4300730737 | 12959 | Fee | GW | P |
| HELPER FED G-5 | 30 | 130S | 110E | 4300730770 | 13655 | Federal | GW | P |
| HELPER FED G-6 | 30 | 130S | 110E | 4300730771 | 13656 | Federal | GW | P |
| HELPER FED G-7 | 31 | 130S | 110E | 4300730772 | 13657 | Federal | GW | P |
| HELPER FED G-8 | 31 | 130S | 110E | 4300730773 | 13658 | Federal | GW | P |
| GOODALL A-1 | 06 | 140S | 110E | 4300730774 | 13348 | Fee | GW | P |
| HELPER FED E-8 | 19 | 130S | 100E | 4300730776 | 13624 | Federal | GW | P |
| HAUSKNECHT A-1 | 21 | 130S | 100E | 4300730781 | 13347 | Fee | GW | P |
| HELPER FED E-9 | 19 | 130S | 100E | 4300730868 | 13628 | Federal | GW | P |
| HELPER FED E-5 | 20 | 130S | 100E | 4300730869 | 13625 | Federal | GW | P |
| HELPER FED E-6 | 20 | 130S | 100E | 4300730870 | 13631 | Federal | GW | P |
| HELPER FED E-10 | 30 | 130S | 100E | 4300730871 | 13629 | Federal | GW | P |
| SACCOMANNO A-1 | 30 | 130S | 100E | 4300730872 | 13622 | Fee | GW | P |
| HELPER FED E-11 | 30 | 130S | 100E | 4300730873 | 13630 | Federal | GW | P |
| BLACKHAWK A-2 | 29 | 130S | 100E | 4300730886 | 13783 | Fee | GW | P |
| BLACKHAWK A-3 | 20 | 130S | 100E | 4300730914 | 13794 | Fee | GW | P |
| BLACKHAWK A-4 | 21 | 130S | 100E | 4300730915 | 13795 | Fee | GW | P |
| BLACKHAWK A-1X | 20 | 130S | 100E | 4300730923 | 13798 | Fee | GW | P |
| HELPER STATE 12-3 | 03 | 140S | 100E | 4300750070 | 17824 | State | GW | P |
| HELPER STATE 32-3 | 03 | 140S | 100E | 4300750071 | 17827 | State | GW | P |
| HELPER STATE 32-36 | 36 | 130S | 100E | 4300750072 | 17825 | State | GW | P |
| VEA 32-32 | 32 | 130S | 100E | 4300750075 | 17826 | Fee | GW | P |
| CLAWSON SPRING ST E-7 | 07 | 160S | 090E | 4301530392 | 12960 | State | GW | P |
| CLAWSON SPRING ST E-8 | 07 | 160S | 090E | 4301530394 | 12964 | State | GW | P |
| CLAWSON SPRING ST E-3 | 06 | 160S | 090E | 4301530403 | 12965 | State | GW | P |
| CLAWSON SPRING ST E-1 | 06 | 160S | 090E | 4301530404 | 12966 | State | GW | P |
| CLAWSON SPRING ST E-2 | 06 | 160S | 090E | 4301530405 | 12961 | State | GW | P |
| CLAWSON SPRING ST E-4 | 06 | 160S | 090E | 4301530406 | 12962 | State | GW | P |
| CLAWSON SPRING ST C-1 | 12 | 160S | 080E | 4301530410 | 12617 | State | GW | P |
| CLAWSON SPRING ST B-1 | 01 | 160S | 080E | 4301530427 | 12845 | State | GW | P |
| CLAWSON SPRING ST B-2 | 01 | 160S | 080E | 4301530428 | 12846 | State | GW | P |
| CLAWSON SPRING ST B-3 | 01 | 160S | 080E | 4301530429 | 12848 | State | GW | P |
| CLAWSON SPRING ST B-4 | 01 | 160S | 080E | 4301530430 | 12854 | State | GW | P |
| CLAWSON SPRING ST B-5 | 12 | 160S | 080E | 4301530431 | 12963 | State | GW | P |
| CLAWSON SPRING ST B-8 | 11 | 160S | 080E | 4301530432 | 12863 | State | GW | P |
| CLAWSON SPRING ST B-9 | 11 | 160S | 080E | 4301530433 | 12864 | State | GW | P |
| CLAWSON SPRING ST C-2 | 12 | 160S | 080E | 4301530434 | 12850 | State | GW | P |

Anadarko Petroleum Corporation (N0035) to Anadarko E&P Onshore, LLC (N3940)
Effective 1-April-2013

| Well Name | Sec | Twnshp | Range | API | Entity No. | Lease Type | Well Type | Well status |
|-------------------------|-----|--------|-------|------------|------------|------------|-----------|-------------|
| CLAWSON SPRING ST C-4 | 14 | 160S | 080E | 4301530435 | 13199 | State | GW | P |
| CLAWSON SPRING ST B-7 | 11 | 160S | 080E | 4301530460 | 12967 | State | GW | P |
| CLAWSON SPRING ST C-6 | 14 | 160S | 080E | 4301530461 | 13355 | State | GW | P |
| CLAWSON SPRING ST C-3 | 12 | 160S | 080E | 4301530463 | 12968 | State | GW | P |
| CLAWSON SPRING ST B-6 | 11 | 160S | 080E | 4301530465 | 12969 | State | GW | P |
| CLAWSON SPRING ST H-1 | 13 | 160S | 080E | 4301530466 | 13323 | State | GW | P |
| CLAWSON SPRING ST H-2 | 13 | 160S | 080E | 4301530467 | 12955 | State | GW | P |
| CLAWSON SPRING ST IPA-1 | 10 | 160S | 080E | 4301530468 | 12956 | Fee | GW | P |
| CLAWSON SPRING ST IPA-2 | 15 | 160S | 080E | 4301530469 | 13200 | Fee | GW | P |
| CLAWSON SPRING ST E-5 | 07 | 160S | 090E | 4301530470 | 12971 | State | GW | P |
| CLAWSON SPRING ST G-1 | 02 | 160S | 080E | 4301530471 | 13014 | State | GW | P |
| CLAWSON SPRING ST F-2 | 03 | 160S | 080E | 4301530472 | 13282 | State | GW | P |
| CLAWSON SPRING ST F-1 | 03 | 160S | 080E | 4301530473 | 13278 | State | GW | P |
| CLAWSON SPRING ST E-6 | 07 | 160S | 090E | 4301530474 | 13052 | State | GW | P |
| CLAWSON SPRING ST G-2 | 02 | 160S | 080E | 4301530475 | 12957 | State | GW | P |
| CLAWSON SPRING ST M-1 | 02 | 160S | 080E | 4301530488 | 13201 | State | GW | P |
| CLAWSON SPRING ST K-1 | 02 | 160S | 080E | 4301530489 | 13202 | State | GW | P |
| SHIMMIN TRUST 3 | 14 | 120S | 100E | 4300730119 | 11096 | Fee | GW | PA |
| SHIMMIN TRUST 1 | 11 | 120S | 100E | 4300730120 | 11096 | Fee | GW | PA |
| SHIMMIN TRUST 2 | 14 | 120S | 100E | 4300730121 | 11096 | Fee | GW | PA |
| SHIMMIN TRUST 4 | 11 | 120S | 100E | 4300730123 | 11096 | Fee | GW | PA |
| ST 9-16 | 16 | 120S | 100E | 4300730132 | 11402 | State | GW | PA |
| ST 2-16 | 16 | 120S | 100E | 4300730133 | 11399 | State | GW | PA |
| MATTS SUMMIT ST A-1 | 14 | 120S | 090E | 4300730141 | 11273 | State | GW | PA |
| SLEMAKER A-1 | 05 | 120S | 120E | 4300730158 | 11441 | Fee | GW | PA |
| JENSEN 16-10 | 10 | 120S | 100E | 4300730161 | 11403 | Fee | GW | PA |
| JENSEN 7-15 | 15 | 120S | 100E | 4300730165 | 11407 | Fee | GW | PA |
| SHIMMIN TRUST 12-12 | 12 | 120S | 100E | 4300730168 | 11420 | Fee | GW | PA |
| JENSEN 11-15 | 15 | 120S | 100E | 4300730175 | 11425 | Fee | GW | PA |
| BRYNER A-1 | 11 | 120S | 120E | 4300730188 | 11503 | Fee | GW | PA |
| BRYNER A-1X (RIG SKID) | 11 | 120S | 120E | 4300730209 | 11503 | Fee | GW | PA |
| BLACKHAWK A-1 | 20 | 130S | 100E | 4300730885 | 13798 | Fee | D | PA |
| BLACKHAWK A-5H | 20 | 130S | 100E | 4300731402 | 17029 | Fee | D | PA |
| CLAWSON SPRING ST SWD 3 | 06 | 160S | 090E | 4301530476 | 12978 | State | D | PA |
| HELPER FED C-6 | 21 | 130S | 100E | 4300730683 | 13008 | Federal | GW | S |
| UTAH 10-415 | 10 | 160S | 080E | 4301530391 | 12632 | State | GW | TA |

| | API Well Number | Well Name | Qtr/Qtr | Section | Township | Range | Mineral Lease Type | Mineral Lease Number | Well Status |
|----|-----------------|-----------------|---------|---------|----------|-------|--------------------|----------------------|-------------|
| 1 | 4300730189 | HELPER FED B-1 | NESW | 33 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 2 | 4300730190 | HELPER FED A-1 | C-SW | 23 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 3 | 4300730213 | HELPER FED A-3 | SESE | 22 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 4 | 4300730214 | HELPER FED C-1 | SENE | 22 | 13S | 10E | Federal | USA UTU 71391 | Producing |
| 5 | 4300730215 | HELPER FED B-5 | NENE | 27 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 6 | 4300730216 | HELPER FED A-2 | NESW | 22 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 7 | 4300730286 | HELPER FED D-1 | SWNE | 26 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 8 | 4300730378 | HELPER FED F-3 | NENE | 8 | 14S | 10E | Federal | USA UTU 65762 | Producing |
| 9 | 4300730379 | HELPER FED F-4 | NWNW | 9 | 14S | 10E | Federal | USA UTU 65762 | Producing |
| 10 | 4300730508 | HELPER FED E-7 | SESE | 19 | 13S | 10E | Federal | USA UTU 77980 | Producing |
| 11 | 4300730530 | HELPER FED B-2 | SENE | 33 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 12 | 4300730531 | HELPER FED B-3 | NESE | 33 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 13 | 4300730532 | HELPER FED B-4 | NENE | 33 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 14 | 4300730533 | HELPER FED B-6 | NENW | 27 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 15 | 4300730534 | HELPER FED B-7 | NESW | 27 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 16 | 4300730535 | HELPER FED B-8 | SESE | 27 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 17 | 4300730536 | HELPER FED B-9 | SENE | 34 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 18 | 4300730537 | HELPER FED B-10 | NWNE | 34 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 19 | 4300730538 | HELPER FED B-11 | SESW | 34 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 20 | 4300730539 | HELPER FED B-12 | NESE | 34 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 21 | 4300730540 | HELPER FED B-13 | SWSE | 28 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 22 | 4300730541 | HELPER FED B-14 | SWSW | 28 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 23 | 4300730542 | HELPER FED D-2 | SWNW | 26 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 24 | 4300730543 | HELPER FED D-3 | SESW | 26 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 25 | 4300730544 | HELPER FED D-4 | NWNW | 35 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 26 | 4300730545 | HELPER FED D-5 | SESW | 35 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 27 | 4300730546 | HELPER FED D-6 | NWSE | 35 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 28 | 4300730547 | HELPER FED E-1 | NESE | 29 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 29 | 4300730548 | HELPER FED E-2 | SESW | 29 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 30 | 4300730549 | HELPER FED H-1 | NENW | 1 | 14S | 10E | Federal | USA UTU 72352 | Producing |
| 31 | 4300730550 | HELPER FED H-2 | SESW | 1 | 14S | 10E | Federal | USA UTU 72352 | Producing |
| 32 | 4300730556 | OLIVETO FED A-2 | NESW | 8 | 14S | 10E | Federal | USA UTU 65762 | Producing |
| 33 | 4300730557 | HELPER FED F-1 | SESE | 8 | 14S | 10E | Federal | USA UTU 65762 | Producing |
| 34 | 4300730558 | SMITH FED A-1 | NWSW | 9 | 14S | 10E | Federal | USA UTU 65762 | Producing |
| 35 | 4300730593 | HELPER FED A-6 | SESE | 23 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 36 | 4300730594 | HELPER FED D-7 | C-SE | 26 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 37 | 4300730595 | HELPER FED D-8 | NENE | 35 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 38 | 4300730677 | HELPER FED A-5 | NENE | 23 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 39 | 4300730678 | HELPER FED A-7 | SENE | 22 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 40 | 4300730679 | HELPER FED B-15 | SENE | 28 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 41 | 4300730680 | HELPER FED B-16 | SWNW | 28 | 13S | 10E | Federal | USA UTU 71392 | Producing |
| 42 | 4300730681 | HELPER FED C-2 | NENW | 24 | 13S | 10E | Federal | USA UTU 71391 | Producing |

| API Well Number | | Well Name | Qtr/Qtr | Section | Township | Range | Mineral Lease Type | Mineral Lease Number | Well Status |
|-----------------|------------|------------------------|---------|---------|----------|-------|--------------------|----------------------|-----------------------|
| 43 | 4300730682 | HELPER FED C-4 | NWSW | 24 | 13S | 10E | Federal | USA UTU 71391 | Producing |
| 44 | 4300730683 | HELPER FED C-6 | SWSE | 21 | 13S | 10E | Federal | USA UTU 71391 | Shut-In |
| 45 | 4300730684 | HELPER FED C-7 | SESW | 21 | 13S | 10E | Federal | USA UTU 71391 | Producing |
| 46 | 4300730685 | HELPER FED D-9 | NWNW | 25 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 47 | 4300730686 | HELPER FED D-10 | SENE | 25 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 48 | 4300730687 | HELPER FED D-11 | SESW | 25 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 49 | 4300730688 | HELPER FED D-12 | SESE | 25 | 13S | 10E | Federal | USA UTU 68315 | Producing |
| 50 | 4300730689 | HELPER FED E-4 | NWNE | 29 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 51 | 4300730692 | HELPER FED A-4 | SWNW | 23 | 13S | 10E | Federal | USA UTU 58434 | Producing |
| 52 | 4300730693 | HELPER FED C-5 | SWNE | 24 | 13S | 10E | Federal | USA UTU 71391 | Producing |
| 53 | 4300730694 | HELPER FED G-1 | C-NW | 30 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 54 | 4300730695 | HELPER FED G-2 | SWSW | 30 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 55 | 4300730696 | HELPER FED G-3 | SENW | 31 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 56 | 4300730697 | HELPER FED G-4 | SESW | 31 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 57 | 4300730698 | HELPER FED H-3 | SWNE | 1 | 14S | 10E | Federal | USA UTU 72352 | Producing |
| 58 | 4300730699 | HELPER FED H-4 | NESE | 1 | 14S | 10E | Federal | USA UTU 72352 | Producing |
| 59 | 4300730702 | HELPER FED C-3 | SESW | 24 | 13S | 10E | Federal | USA UTU 71391 | Producing |
| 60 | 4300730770 | HELPER FED G-5 | SWNE | 30 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 61 | 4300730771 | HELPER FED G-6 | SWSE | 30 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 62 | 4300730772 | HELPER FED G-7 | NWNE | 31 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 63 | 4300730773 | HELPER FED G-8 | NESE | 31 | 13S | 11E | Federal | USA UTU 71677 | Producing |
| 64 | 4300730776 | HELPER FED E-8 | SENE | 19 | 13S | 10E | Federal | USA UTU 77980 | Producing |
| 65 | 4300730868 | HELPER FED E-9 | SESW | 19 | 13S | 10E | Federal | USA UTU 77980 | Producing |
| 66 | 4300730869 | HELPER FED E-5 | SWSW | 20 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 67 | 4300730870 | HELPER FED E-6 | SWNW | 20 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 68 | 4300730871 | HELPER FED E-10 | NENW | 30 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 69 | 4300730873 | HELPER FED E-11 | NWNE | 30 | 13S | 10E | Federal | USA UTU 71675 | Producing |
| 70 | 4300730119 | SHIMMIN TRUST 3 | SENW | 14 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 71 | 4300730120 | SHIMMIN TRUST 1 | SESE | 11 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 72 | 4300730121 | SHIMMIN TRUST 2 | SENE | 14 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 73 | 4300730123 | SHIMMIN TRUST 4 | SESW | 11 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 74 | 4300730158 | SLEMAKER A-1 | SWNE | 5 | 12S | 12E | Fee (Private) | | Plugged and Abandoned |
| 75 | 4300730161 | JENSEN 16-10 | SESE | 10 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 76 | 4300730165 | JENSEN 7-15 | SWNE | 15 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 77 | 4300730168 | SHIMMIN TRUST 12-12 | NWSW | 12 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 78 | 4300730175 | JENSEN 11-15 | NESW | 15 | 12S | 10E | Fee (Private) | | Plugged and Abandoned |
| 79 | 4300730188 | BRYNER A-1 | NESE | 11 | 12S | 12E | Fee (Private) | | Plugged and Abandoned |
| 80 | 4300730209 | BRYNER A-1X (RIG SKID) | NESE | 11 | 12S | 12E | Fee (Private) | | Plugged and Abandoned |
| 81 | 4300730348 | BIRCH A-1 | NWSW | 5 | 14S | 10E | Fee (Private) | | Producing |
| 82 | 4300730352 | CHUBBUCK A-1 | NESE | 31 | 13S | 10E | Fee (Private) | | Producing |
| 83 | 4300730353 | VEA A-1 | SWNW | 32 | 13S | 10E | Fee (Private) | | Producing |
| 84 | 4300730354 | VEA A-2 | NENE | 32 | 13S | 10E | Fee (Private) | | Producing |

| API Well Number | Well Name | Qtr/Qtr | Section | Township | Range | Mineral Lease Type | Mineral Lease Number | Well Status |
|-----------------|------------|-------------------------|---------|----------|-------|--------------------|----------------------|-----------------------------------|
| 85 | 4300730355 | VEA A-3 | SESW | 32 | 13S | 10E | Fee (Private) | Producing |
| 86 | 4300730356 | VEA A-4 | NWSE | 32 | 13S | 10E | Fee (Private) | Producing |
| 87 | 4300730372 | BIRCH A-2 | NWNW | 8 | 14S | 10E | Fee (Private) | Producing |
| 88 | 4300730570 | SE INVESTMENTS A-1 | NESE | 6 | 14S | 10E | Fee (Private) | Producing |
| 89 | 4300730586 | HARMOND A-1 | SENE | 7 | 14S | 10E | Fee (Private) | Producing |
| 90 | 4300730604 | CHUBBUCK A-2 | SENW | 6 | 14S | 10E | Fee (Private) | Producing |
| 91 | 4300730726 | CLAWSON SPRING ST J-1 | SESW | 35 | 15S | 8E | Fee (Private) | Producing |
| 92 | 4300730727 | PIERUCCI 1 | SENW | 35 | 15S | 8E | Fee (Private) | Producing |
| 93 | 4300730728 | POTTER ETAL 1 | SWNE | 35 | 15S | 8E | Fee (Private) | Producing |
| 94 | 4300730737 | POTTER ETAL 2 | NESE | 35 | 15S | 8E | Fee (Private) | Producing |
| 95 | 4300730774 | GOODALL A-1 | NWSW | 6 | 14S | 11E | Fee (Private) | Producing |
| 96 | 4300730781 | HAUSKNECHT A-1 | SWNW | 21 | 13S | 10E | Fee (Private) | Producing |
| 97 | 4300730872 | SACCOMANNO A-1 | NESE | 30 | 13S | 10E | Fee (Private) | Producing |
| 98 | 4300730885 | BLACKHAWK A-1 | SESE | 20 | 13S | 10E | Fee (Private) | Plugged and Abandoned |
| 99 | 4300730886 | BLACKHAWK A-2 | NWNW | 29 | 13S | 10E | Fee (Private) | Producing |
| 100 | 4300730914 | BLACKHAWK A-3 | SENE | 20 | 13S | 10E | Fee (Private) | Producing |
| 101 | 4300730915 | BLACKHAWK A-4 | NENE | 21 | 13S | 10E | Fee (Private) | Producing |
| 102 | 4300730923 | BLACKHAWK A-1X | SESE | 20 | 13S | 10E | Fee (Private) | Producing |
| 103 | 4300731402 | BLACKHAWK A-5H | NENE | 20 | 13S | 10E | Fee (Private) | Plugged and Abandoned |
| 104 | 4300750075 | VEA 32-32 | SWNE | 32 | 13S | 10E | Fee (Private) | Producing |
| 105 | 4301530468 | CLAWSON SPRING ST IPA-1 | SESE | 10 | 16S | 8E | Fee (Private) | Producing |
| 106 | 4301530469 | CLAWSON SPRING ST IPA-2 | NENE | 15 | 16S | 8E | Fee (Private) | Producing |
| 107 | 4300730132 | ST 9-16 | NESE | 16 | 12S | 10E | State | ML-44443 Plugged and Abandoned |
| 108 | 4300730133 | ST 2-16 | NWNE | 16 | 12S | 10E | State | ML-44443 Plugged and Abandoned |
| 109 | 4300730141 | MATTS SUMMIT ST A-1 | NWNW | 14 | 12S | 9E | State | ML-44496 Plugged and Abandoned |
| 110 | 4300730349 | HELPER ST A-1 | SENW | 3 | 14S | 10E | State | ST UT ML 45805 Producing |
| 111 | 4300730350 | HELPER ST D-7 | NWSW | 4 | 14S | 10E | State | ST UT ML 45804 Producing |
| 112 | 4300730357 | HELPER ST A-8 | NWSE | 2 | 14S | 10E | State | ST UT ML 45805 Producing |
| 113 | 4300730358 | HELPER ST A-3 | NWNW | 2 | 14S | 10E | State | ST UT ML 45805 Producing |
| 114 | 4300730359 | HELPER ST A-4 | NWNE | 2 | 14S | 10E | State | ST UT ML 45805 Producing |
| 115 | 4300730360 | HELPER ST A-7 | NESW | 2 | 14S | 10E | State | ST UT ML 45805 Producing |
| 116 | 4300730362 | HELPER ST A-2 | NENE | 3 | 14S | 10E | State | ST UT ML 45805 Producing |
| 117 | 4300730363 | HELPER ST A-5 | NESW | 3 | 14S | 10E | State | ST UT ML 45805 Producing |
| 118 | 4300730364 | HELPER ST A-6 | NESE | 3 | 14S | 10E | State | ST UT ML 45805 Producing |
| 119 | 4300730365 | HELPER ST D-4 | SWNW | 4 | 14S | 10E | State | ST UT ML 45804 Producing |
| 120 | 4300730366 | HELPER ST D-3 | NENE | 5 | 14S | 10E | State | ST UT ML 45804 Producing |
| 121 | 4300730367 | HELPER ST D-5 | NWNE | 4 | 14S | 10E | State | ST UT ML 45804 Producing |
| 122 | 4300730368 | HELPER ST D-8 | SESE | 4 | 14S | 10E | State | ST UT ML 45804 Producing |
| 123 | 4300730369 | HELPER ST D-2 | NENW | 5 | 14S | 10E | State | ST UT ML 45804 Producing |
| 124 | 4300730370 | HELPER ST D-6 | SESE | 5 | 14S | 10E | State | ST UT ML 45804 Producing |
| 125 | 4300730371 | HELPER ST D-1 | NENE | 6 | 14S | 10E | State | ST UT ML 45804 Producing |
| 126 | 4300730373 | HELPER ST A-9 | SENW | 10 | 14S | 10E | State | ST UT ML 45805 Producing |

| | API Well Number | Well Name | Qtr/Qtr | Section | Township | Range | Mineral Lease Type | Mineral Lease Number | Well Status |
|-----|-----------------|-----------------------|---------|---------|----------|-------|--------------------|----------------------|-----------------------|
| 127 | 4300730376 | HELPER ST B-1 | SWNE | 9 | 14S | 10E | State | ST UT ML 47556 | Producing |
| 128 | 4300730433 | HELPER ST A-10 | NWNE | 10 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 129 | 4300730434 | HELPER ST A-11 | SWNW | 11 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 130 | 4300730435 | HELPER ST A-12 | NWSW | 10 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 131 | 4300730436 | HELPER ST A-13 | NESE | 10 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 132 | 4300730437 | HELPER ST B-2 | NESE | 9 | 14S | 10E | State | ST UT ML 47556 | Producing |
| 133 | 4300730571 | HELPER ST A-14 | SESW | 11 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 134 | 4300730572 | HELPER ST A-15 | SENE | 11 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 135 | 4300730573 | HELPER ST E-1 | SESW | 36 | 13S | 10E | State | ST UT ML 45802 | Producing |
| 136 | 4300730574 | HELPER ST E-2 | SWNW | 36 | 13S | 10E | State | ST UT ML 45802 | Producing |
| 137 | 4300730592 | HELPER ST E-3 | NENE | 36 | 13S | 10E | State | ST UT ML 45802 | Producing |
| 138 | 4300730597 | CLAWSON SPRING ST A-1 | SWSE | 36 | 15S | 8E | State | ST UT ML 46106 | Producing |
| 139 | 4300730598 | HELPER ST E-4 | SWSE | 36 | 13S | 10E | State | ST UT ML 45802 | Producing |
| 140 | 4300730603 | HELPER ST A-16 | SWSE | 11 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 141 | 4300730635 | CLAWSON SPRING ST A-2 | NWNW | 36 | 15S | 8E | State | ST UT ML 46106 | Producing |
| 142 | 4300730636 | CLAWSON SPRING ST A-3 | NESW | 36 | 15S | 8E | State | ST UT ML 46106 | Producing |
| 143 | 4300730637 | CLAWSON SPRING ST A-4 | NWNE | 36 | 15S | 8E | State | ST UT ML 46106 | Producing |
| 144 | 4300730642 | CLAWSON SPRING ST D-5 | NENW | 31 | 15S | 9E | State | ML-48226 | Producing |
| 145 | 4300730643 | CLAWSON SPRING ST D-6 | SWSW | 31 | 15S | 9E | State | ML-48226 | Producing |
| 146 | 4300730644 | CLAWSON SPRING ST D-7 | NWNE | 31 | 15S | 9E | State | ML-48226 | Producing |
| 147 | 4300730701 | CLAWSON SPRING ST D-8 | NWSE | 31 | 15S | 9E | State | ML-48226 | Producing |
| 148 | 4300750070 | HELPER STATE 12-3 | SWNW | 3 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 149 | 4300750071 | HELPER STATE 32-3 | SWNE | 3 | 14S | 10E | State | ST UT ML 45805 | Producing |
| 150 | 4300750072 | HELPER STATE 32-36 | SWNE | 36 | 13S | 10E | State | ST UT ML 45802 | Producing |
| 151 | 4301530391 | UTAH 10-415 | NENE | 10 | 16S | 8E | State | ST UT ML 48189 | Temporarily-Abandoned |
| 152 | 4301530392 | CLAWSON SPRING ST E-7 | SENE | 7 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 153 | 4301530394 | CLAWSON SPRING ST E-8 | SWSE | 7 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 154 | 4301530403 | CLAWSON SPRING ST E-3 | SENE | 6 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 155 | 4301530404 | CLAWSON SPRING ST E-1 | SENE | 6 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 156 | 4301530405 | CLAWSON SPRING ST E-2 | NESW | 6 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 157 | 4301530406 | CLAWSON SPRING ST E-4 | NWSE | 6 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 158 | 4301530410 | CLAWSON SPRING ST C-1 | SWNW | 12 | 16S | 8E | State | ST UT UO 48209 | Producing |
| 159 | 4301530427 | CLAWSON SPRING ST B-1 | NENW | 1 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 160 | 4301530428 | CLAWSON SPRING ST B-2 | NWSW | 1 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 161 | 4301530429 | CLAWSON SPRING ST B-3 | NWNE | 1 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 162 | 4301530430 | CLAWSON SPRING ST B-4 | SESE | 1 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 163 | 4301530431 | CLAWSON SPRING ST B-5 | SWSW | 12 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 164 | 4301530432 | CLAWSON SPRING ST B-8 | SENE | 11 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 165 | 4301530433 | CLAWSON SPRING ST B-9 | NWSE | 11 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 166 | 4301530434 | CLAWSON SPRING ST C-2 | SENE | 12 | 16S | 8E | State | ST UT UO 48209 | Producing |
| 167 | 4301530435 | CLAWSON SPRING ST C-4 | SWNW | 14 | 16S | 8E | State | ST UT UO 48209 | Producing |
| 168 | 4301530460 | CLAWSON SPRING ST B-7 | NWSW | 11 | 16S | 8E | State | ST UT ML 48216 | Producing |

| | API Well Number | Well Name | Qtr/Qtr | Section | Township | Range | Mineral Lease Type | Mineral Lease Number | Well Status |
|-----|-----------------|-----------------------|---------|---------|----------|-------|-----------------------|----------------------|-------------|
| 169 | 4301530461 | CLAWSON SPRING ST C-6 | SENE | 14 | 16S | 8E | State | ST UT UO 48209 | Producing |
| 170 | 4301530463 | CLAWSON SPRING ST C-3 | C-SE | 12 | 16S | 8E | State | ST UT UO 48209 | Producing |
| 171 | 4301530465 | CLAWSON SPRING ST B-6 | NENW | 11 | 16S | 8E | State | ST UT ML 48216 | Producing |
| 172 | 4301530466 | CLAWSON SPRING ST H-1 | NENW | 13 | 16S | 8E | State | ST UT ML 48217-A | Producing |
| 173 | 4301530467 | CLAWSON SPRING ST H-2 | NENE | 13 | 16S | 8E | State | ST UT ML 48217-A | Producing |
| 174 | 4301530470 | CLAWSON SPRING ST E-5 | NENW | 7 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 175 | 4301530471 | CLAWSON SPRING ST G-1 | NWNW | 2 | 16S | 8E | State | ST UT ML 46314 | Producing |
| 176 | 4301530472 | CLAWSON SPRING ST F-2 | NESE | 3 | 16S | 8E | State | ST UT ML 48515 | Producing |
| 177 | 4301530473 | CLAWSON SPRING ST F-1 | SENE | 3 | 16S | 8E | State | ST UT ML 48514 | Producing |
| 178 | 4301530474 | CLAWSON SPRING ST E-6 | SESW | 7 | 16S | 9E | State | ST UT ML 48220-A | Producing |
| 179 | 4301530475 | CLAWSON SPRING ST G-2 | NESW | 2 | 16S | 8E | State | ST UT ML 46314 | Producing |
| 180 | 4301530488 | CLAWSON SPRING ST M-1 | NWNE | 2 | 16S | 8E | State | ST UT ML 47561 | Producing |
| 181 | 4301530489 | CLAWSON SPRING ST K-1 | SESE | 2 | 16S | 8E | State | ST UT ML 46043 | Producing |

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

UIC FORM 5

TRANSFER OF AUTHORITY TO INJECT

| | |
|--|--|
| Well Name and Number See Wells | API Number See Wells |
| Location of Well Footage : _____ County : _____ QQ, Section, Township, Range: _____ State : UTAH | Field or Unit Name Lease Designation and Number |

EFFECTIVE DATE OF TRANSFER: 4/1/2013

RECEIVED

APR 09 2013

DIV. OF OIL, GAS & MINING

CURRENT OPERATOR

Company: Anadarko Petroleum Corporation Name: Jaime Scharnowske
Address: P.O. Box 173779 Signature: Jaime Scharnowske
city Denver state CO zip 80217 Title: Regulatory Analyst
Phone: (720) 929-6000 Date: 4/8/2013
Comments: The operator is requesting authorization to transfer the wells from Anadarko Petroleum Corporation to Anadarko E&P Onshore, LLC. The state wells will be under bond number 22013542, and the federal well will be under bond number WYB000291.

NEW OPERATOR

Company: Anadarko E&P Onshore, LLC Name: Jaime Scharnowske
Address: P.O. Box 173779 Signature: Jaime Scharnowske
city Denver state CO zip 80217 Title: Regulatory Analyst
Phone: (720) 929-6000 Date: 4/8/2013
Comments:

(This space for State use only)

Transfer approved by: Dan Jones

Approval Date: 4/10/13

Title: UIC Geologist

Comments:

| API Well Number | Injection Permit Number | Well Name | Section | Township | Range | Mineral Lease Type | Current Well Status | Well Type |
|-----------------|-------------------------|-------------------------|---------|----------|-------|--------------------|---------------------|---------------------|
| 4300730361 | UIC-201.1 | HELPER ST SWD 1 | 3 | 14S | 10E | ML 45805 | Active | Water Disposal Well |
| 4301530477 | UIC-266.1 | CLAWSON SPRING ST SWD 4 | 13 | 16S | 8E | ML 48217 | Active | Water Disposal Well |
| 4300730555 | UIC-243.1 | FED F-2 SWD | 8 | 14S | 10E | UTU 65762 | Active | Water Disposal Well |
| 4300730721 | UIC-264.1 | CLAWSON SPRING ST SWD 1 | 36 | 15S | 8E | ML 46106 | Inactive | Water Disposal Well |



GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

June 25, 2014

Anadarko E&P Onshore, LLC
60 S. 700 E. Unit #1
Price, UT 84501

SUBJECT: Pressure Test for Mechanical Integrity, Fed F-2 SWD (API# 43-007-30555) & Clawson Spring St SWD 4 (API# 43-015-30477) Wells, Carbon & Emery Counties, Utah:

To Whom It May Concern:

The Underground Injection Control Program, which the Division of Oil, Gas and Mining (DOGM) administers in Utah, requires that all Class II injection wells demonstrate mechanical integrity. Rule R649-5-5.3 of the Oil and Gas Conservation General Rules requires that the casing-tubing annulus above the packer be pressure tested at a pressure equal to the maximum authorized injection pressure or 1,000 psi, whichever is lesser, provided that no test pressure is less than 300 psi. This test shall be performed at least every five-year period beginning October 1982. The following well requires a current test:

→ Fed F-2 SWD 43-007-30555
Clawson Springs St SWD 4 43-015-30477

8 14S 10E

Please make arrangements and ready wells for testing during the week of August 11th, 2014, as outlined below:

1. Operator must furnish connections, and accurate pressure gauges, hot oil truck (or other means of pressuring annulus), along with personnel to assist in opening valves, etc.
2. The casing-tubing annulus shall be filled prior to the test date to expedite testing, as each well will be required to hold pressure for a minimum of 15 minutes.
3. If mechanical difficulties or workover operations make it impossible for the well(s) to be tested on this date the test(s) may be rescheduled.
4. Company personnel should meet a DOGM representative(s) at the field office or other location as negotiated.



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June 25, 2014
Anadarko E&P Onshore, LLC

5. All bradenhead valves with exception of the tubing on the injection well(s) must be shut-in 24 hours prior to testing.

Please contact me at (435) 820-0862 to arrange a meeting time and place or to negotiate a different date, if the date(s) specified is unacceptable.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bart Kettle', with a long horizontal line extending to the right.

Bart Kettle
Environmental Scientist

bk/dj/js

cc: Dan Jarvis, Operations Manager
Well File